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ABSTRACT

This volume contains abstracts of 157 original research papers scheduled for presentation at the Boston, Massachusetts Convention of the American Alliance for Health, Physical Education, Recreation and Dance. The papers are grouped by the topic of each session, which included: tests and measurements: motor development: exercise physiology: sociology of sport: history of sport: biomechanics: adapted physical education: professional preparation: health education: and dance and recreation. The time and date for the presentation of each paper is indicated along with the name and address of the presenter, in case further information is wanted. An index of all the authors is presented at the end of this volume. (CJ)

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ABSTRACTS

of Research Papers 1981

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in the Research Consortium Meetings

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PREFACE

This volume of Abstracts of Research Papers 1981 includes abstracts of 157 original research papers scheduled for presentation at the Boston, Massachusetts Convention of the American Alliance for Health, Physical Education, Recreation, and Dance, April 13-17, 1981. The papers are grouped by topic for each session, as noted in the Table of Contents.

The time and date for the presentation of each paper are indicated in the lower left-hand corner of each abstract. The name and address of the author to whom inquiries for further information may be sent appear in the lower right-hand corner. An index of all authors is presented at the conclusion of this volume.

Please note that a list of reviewers is included on the next page. These people reviewed abstracts in their area of expertise for inclusion in the program and this volume.

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Reviewers for Abstracts

The Editor gratefully acknowledges the invaluable assistance of the individuals listed below who reviewed and evaluated abstracts in order to select those which would be presented and included in this publication. The time, effort, and expertise provided by these reviewers are deeply appreciated.

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G.A.S.

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THE RELATIONSHIP BETWEEN BODY IMAGE AND BODY COMPOSITION.

K.F. Langston, Texas A&I University; A.S. Jackson, University of Housto[illegible]; J.A. Bell, Texas A&I University.

The relationship between percent body fat (%F) and body image (BI) was studied with 170 female college students (Age: $\bar{X}$ = 20.1 ± 1.7 years). %F was measured with a generalized body density regression equation and BI was determined using the Secord-Jourard body-cathexis scale. The women were mainly of Hispanic descent (54%) and had a high %F ($\bar{X}$ = 31.6 ± 4.6%). Factor analysis of the BI scales isolated a major factor relating to body parts associated with weight (e.g., thigh, hips). A significant correlation (r = -.47) between %F and the BI weight factor showed that females with high %F had lower BI than women with low %F. Subsequent regression analysis showed that BI factors not related to body parts accounted for only an additional 2% of %F variance. Since prior research has found a relationship between BI and self-esteem, these findings suggest a causal relationship may exist between %F and self-esteem, but this causal relationship awaits experimental testing. These results showed the BI and %F are related in young adult women.

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April 14, 1981
8:45 a.m.

PERFORMANCE NORMS FOR COMPETITIVE SWIMMING. Robert Murray, Boise State University.

The purpose of this study was to analyze competitive swimming performance times in an attempt to generate performance norms for short course events. The thirty fastest performances from preliminary, consolation, and championship heats in each 100- and 200-yard event from each NCAA Division 1 Championship 1975 to 1979 were analyzed. Descriptive data (means and standard errors) were determined for all split and final times in each event and year. The means for each split time or combinations of split times for each event and year were computed as percentages of the total time. Descriptive data and percentages of final times were tested for differences within each event and among events and years. Differences among years were tested by one-way analyses of variance with appropriate post hoc tests. Differences within years were tested by t-tests for uncorrelated equally sized groups. The resultant F and t ratios were considered significant at the .05 alpha level. Significant differences in split and final times among years occurred with regularity in all events. However, differences among percentages of final times (split times divided by final times multiplied by 100) were virtually nonexistent in 100 yard races and occurred only sporadically in 200 yard events. This knowledge allows for construction of performance norms for each 100 and 200 yard event which may be adapted to suit swimmers of all skill levels.

Dr. Robert Murray
Department of Physical Education
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April 14, 1981
9:00 a.m.

ANALYSIS OF PERFORMANCE IN BENT-LEG AND STRAIGHT-LEG SIT-UP POSITIONS. Lynn W. McCraw, University of Texas at Austin.

Using 98 college men and women, the bent-leg and straight-leg sit-up positions were compared on the basis of measures of muscular strength and muscular endurance. Examined also were relationships among endurance and strength tests. Strength was measured with the cable tensiometer using apparatus designed by the investigator. Measurements were obtained with legs bent when seated and legs straight while standing. Strength was measured for both bent-leg and straight-leg with subjects supine on a table with an opening underneath the shoulders. In all tests subjects exerted force through a strap passing around the thorax outside arms at shoulder level. The score was the average of two trials. Isotonic endurance was measured with the 60-second sit-up test using standard procedures for the bent-leg and straight-leg positions. Isometric endurance was measured in the sit-ups positions by having subject raise the trunk until it just cleared the floor. The score was the number of seconds the position was held. An analysis through use of the t test and coefficients of correlation revealed the following: no significant difference in endurance between bent and straight-legs, no significant difference in strength in supine position but significant higher scores with legs straight in the upright position, significantly higher scores in the supine over the upright position for the strength test, substantial relationship among strength measures (r's = .66 to .90) and among the endurance tests (r's = .61 to .78), little or no relationship between endurance tests and strength measures (r's = -.16 to .35). While strength may be involved, sit-ups are considered to measure muscular endurance rather than strength. Further, contrary to belief by many persons, the thigh flexor muscles do not appear to be more effective in straight-leg sit-ups. Likewise, they are not more effective in the strength test in the supine position as in the sit-ups. However, the thigh flexor muscles apparently are more effective with the legs straight in the strength test in the upright position. This presumably is due to leverage. While upright, the fulcrum is at the hips and in strength tests in the supine position and at the beginning of sit-ups, the fulcrum is at the thorax just below the shoulders.

Lynn W. McCraw
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April 14, 1981
9:15 a.m.

COMPARATIVE ANALYSIS OF POWER MEASURES OF MEN AND WOMEN. Jack K. Nelson and Jeff Dorociak, Louisiana State University, Baton Rouge.

Power is defined as the rate of doing work. Technically, it involves force, the distance the force is moved, and the time needed for the movement. Field tests of power have typically involved jumps, throws and short sprints. A person's body weight is an important factor in power performance, and yet weight is generally not included in the scoring of most field tests. Differences in power between men and women may be reduced considerably when viewed in relation to body weight. This study sought to examine power measures through factor analysis and to compare power performances of men and women with regard to the manner in which power is measured and the population from which the subjects are drawn. Male and female subjects (N=55) were drawn from activity classes and administered the following tests of power: the vertical jump, standing broad jump, a timed vertical jump, a modified Margaria stair climb, a triple broad jump, a 20 yd dash and a 40 yd dash. Three power factors were hypothesized concerning vertical and linear movement and body weight. Orthogonal and oblique rotations revealed four factors for women and three for men. Two of the three hypotheses were supported. As expected men were superior to women in all power measures. However, when the measures were viewed as ratios of performance to body weight, the performances were much more similar, particularly in the long jumps. When performances of male and female physical education majors (N=178) were analyzed, the ratios were even more similar; in fact, the ratios of the female majors surpassed some of the male ratios. As hypothesized, the measurement of power is quite specific to the manner in which it is assessed. The actual measurement of power as rate of doing work was not found to agree with Lewis Nomogram's predicted power score.

Jack K. Nelson
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April 14, 1981
9:30 a.m.

MATHEMATICAL MODEL FOR ANALYSIS OF SERVICE OPTIONS IN TENNIS.

Harry A. King, San Diego State U; John A.W. Baker, Southern Illinois University.

Tennis players are allowed two attempts to put the ball into play from the service. At all levels of play, they generally use a "strong" serve (S) on the first attempt and a "weak" serve (W) on the second attempt. (That is, they use a SW strategy.) This study employed a post-hoc analysis of the complete stroke-by-stroke records of 10 tennis matches among world-class women players to examine whether the strong-weak service strategy did indeed appear to be the one most likely to improve match-winning probability. Mathematical equations were developed expressing a player's point-winning probability for each of four service strategies (SW, SS, WW, WS) in terms of four fundamental probabilities: (1) $p(S)$--strong serve was good (i.e.legal); (2) $p(W)$--weak serve was good (i.e.legal); (3) $p(A|S)$--game point was won following a strong serve; and (4) $p(A|W)$--game point was won following a weak serve. Since empirical estimates could be made of these latter four quantities, empirical estimates could be made of each player's point-winning probability under each of the four service strategies. Results indicated that the SW service strategy was by no means clearly superior for all the players considered. On the contrary, there was some indication that for some players SS or WW service strategies may actually be more likely to improve point-winning (and hence match-winning) probability.

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April 14, 1981
9:45 a.m.

THE EFFECTS OF DIFFERENT TESTORS AND INSTRUMENTS UPON SKINFOLD MEASUREMENTS. Stephen M. Livingston, Rice University; James R. Morrow, Jr., and Andrew S. Jackson, University of Houston.

The AAHPERD Health Related Fitness Test includes the assessment of subcutaneous fat. Many physical educators will thus necessarily be interested in obtaining assessment of skinfolds for their students. Additionally, many physiologists and fitness directors are beginning to assess body composition characteristics through the use of skinfolds. One of the major issues related to gathering skinfold data is the reliability and objectivity with which such data can be obtained. The present study, an extension of reliability theory, was developed to determine the amount of variation in skinfolds that is related to several sources of variation. In particular, components of variance that were related to 1) gender of the subject, 2) testors, 3) skinfold sites, 4) skinfold instruments, 5) repeated assessments at the same site and 6) subjects within gender were determined. In addition, all components of variance for interactive effects were assessed in a repeated measures analysis of variance model with gender of the subject as fixed and all other facets of a random nature. The skinfold sites utilized were thigh, suprailiac, abdomen, and triceps. The Lange, Fat-o-meter, and McGaw skinfold calipers were utilized. Testors were trained in a short period by having them read prepared directions and then observe one measurement at each site. The primary sources of variation based upon components of variance were gender by site (35.2%), persons within gender (19.3%), sites (11.4%), and persons within gender by site (9.7%). None of the total variance was due to testors, instruments, or repeated measurements. Thus, skinfold measurements are generalizable across these facets. With a brief orientation period testors obtain similar results. In summary, the majority of skinfold variation was attributable to sites and subject differences while little variation was due to testors, instruments and repeated measurements at sites. These results suggest that different testors and instruments will yield similar skinfold measurements.

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April 14, 1981
10:00 a.m.

UNWEIGHTED MEANS AND COMPLETE LEAST-SQUARES REGRESSION ANALYSES OF DISPROPORTIONATE CELL DATA. Marilyn Looney, Indiana University

The problem was to determine under which cell conditions of disproportionate 3x3 factorial designs, complete least-squares regression or method of unweighted means is the more appropriate analysis in terms of committing Type I and Type II errors. Thirty 3x3 factorial designs representing different combinations of cell size ratio, pattern of nonorthogonality, and pattern of significant hypothesized main effects and/or interaction were investigated. Each factorial design pattern was replicated 500 times. Data from each replicate were analyzed by unweighted means analysis and complete least-squares regression method. The proportion of row, column, and interaction hypotheses rejected were calculated for each method. The proportion of rejected true null hypotheses was the dependent variable for a series of three-way analyses of variance: method by cell size ratio by pattern of nonorthogonality for each hypothesis of each significant effect pattern. Observed Type I error rates and power values were compared to nominal level of significance and nominal power, respectively. Type I error rates were comparable for complete least-squares regression and unweighted means analysis, and the majority of these error rates did not digress significantly from .05. Power values were comparable for both methods when 2:1 cell size ratio existed. Power values were comparable when 4:1 cell size ratio with first degree of nonorthogonality existed, but they were significantly less than .80. As cell size ratio increased from 4:1, complete least-squares regression had higher power values than unweighted means analysis. The following conclusions appeared warranted. Either complete least-squares regression or unweighted means analysis is an appropriate method for data analysis of disproportionate cell data with 2:1 cell size ratio and mild or extreme degree of nonorthogonality, and 4:1 cell size ratio with mild degree of nonorthogonality. Complete least-squares regression is more appropriate than unweighted means analysis when 4:1 cell size ratio with extreme degree of nonorthogonality or 8:1 cell size ratio exists.

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April 14, 1981
10:15 a.m.

IMPACT OF PREVIOUS PHYSICAL EDUCATION EXPERIENCES ON CURRENT PHYSICAL ACTIVITY HABITS OF URBAN ADULT FEMALES.

Peggy J. Foss, University of Michigan-Dearborn,

The purpose of the study was to identify the major factors that support or inhibit the initiation and maintenance of physical activity programs (PAPs) of a select group of urban women. Among the factors studied were the influence of previous experiences in elementary (ES), junior high (JH) and secondary (HS) school physical education (PE) classes, co-curricular sports and childhood play habits. Related factors studied were specific sports engaged in, instructional and program emphases and the perceived enjoyment from participation. Questionnaires were mailed to a random sample (N=700) of nonstudent and nonretiree females, over 18 years of age, who resided in 10 urban centers in Michigan. The 477 respondents ($\bar{X}$ age = 45 ± 12 yrs.) were categorized as being physically active (N=136) or inactive (N=431) according to the recommended criteria to enhance endurance fitness published by the American College of Sports Medicine. The chi-square test of homogeniety for equal proportions was employed to determine if there was a significant difference between the Actives and Inactives in relation to selected variables. A significantly greater proportion ($P < .05$) of Actives than Inactives had participated in PE classes, in general, and specifically during ES and JH, had instruction in swimming during ES, had instruction in dance and leisure-time sports, and in general had coeducational PE classes during HS and expressed enjoyment of participation in PE during HS. A significantly greater proportion ($P < .05$) of Inactives than Actives had instruction in team sports, in general, and specifically leisure-time sports during JH and swimming during HS. The Inactives could not recall the instructional emphases employed by their PE teachers, while the Actives were exposed to "play-the-game" techniques. Homogeniety existed between groups in relation to participation in co-curricular sports. The Actives were influenced in the development of childhood play habits by fathers, siblings and peers. The Actives indicated their experiences in PE and the health and fitness concepts taught during PE classes did not serve as sources in the development of their PAPs. Physical educators should promote the components of the PE program which exert a positive influence on the development of PAPs, concentrate on creating and sustaining student interest in physical activity, provide opportunities for child-parent play and promote family sports participation. Physical education must be continued as an essential component of ES and JH curricula.

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April 14, 1981
10:45 a.m.

DEVELOPMENTAL EFFECTS IN PRESELECTED AND CONSTRAINED MOVEMENTS.

Jere D. Gallagher, Southern Illinois University; Jerry R. Thomas, Louisiana State University.

Several studies have shown that performance in linear positioning movements is significantly better when adult subjects are allowed to preselect the movement location rather than the experimenter selecting the location (constrained movement). Apparently the preselection effect is the result of a better plan for remembering the location. However, considerable research indicated that children are not as effective in processing information as adults, frequently resulting in a poorer memory plan. This study tested the preselected vs constrained effect developmentally for four age groups known to differ on use of rehearsal strategies--6 yr olds, 7 yr olds, 11 yr olds, and adults. At each age level 40 subjects were randomly assigned to one of four conditions: movement location preselected and cued to rehearse, movement location preselected but not cued to rehearse, movement location constrained and cued to rehearse, movement position constrained but not cued to rehearse. Each subject was tested at 8 randomly selected positions on a linear slide in a memory paradigm under one of the four treatment conditions. Error scores obtained were AE, CE, VE, and |CE| which were analyzed in a 4 (age) X 2 (preselected-constrained) X 2 (cue--no-cue) MANOVA with appropriate follow-up analyses. Effects of major interest were an age X preselected-constrained interaction for AE, $\underline{F}$ (3,145) = 3.02, $p < .05$, indicating no differences between preselected and constrained movements at the three younger age levels, but performance was significantly better for adults when preselected were compared to constrained movements. Additionally, a significant age X preselected - constrained X cue--no-cue interaction existed for both AE, $\underline{F}$ (3,145) = 2.65, and VE, $\underline{F}$ (3,145) = 2.84, $p < .05$. These results suggested that cueing subjects to rehearse resulted in a more linear decrease in variability across age for both preselected and constrained movements. Both interactions support a processing deficits hypothesis as an explanation for poorer performance by younger subjects.

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April 14, 1981
11:00 a.m.

KNOWLEDGE OF MOVEMENT RESPONSE MODE: EFFECTS OF DEVELOPMENT.

Kathi T. Winther, Jerry R. Thomas, Louisiana State University.

Research has indicated that if a subject is pre-informed about the mode of recall for a preselected movement in which both visual and kinesthetic information is available, attention can be directed to the specific mode of recall resulting in better performance when compared to uninformed subjects. However, the developmental processing literature indicates that attention switching between various sensory modes is deficient in younger children, so pre-information about the mode of recall should not be as helpful to them. This study tested the hypothesis that pre-informing younger subjects about the mode of recall for preselected movements would be of less value than for older subjects on a movement reproduction task. At each of four age levels (6 yrs, 7 yrs, 11 yrs, and adults), 24 subjects were randomly assigned to either a pre-informed or uninformed recall group. Within each group recall was in one of three modes--vision only, kinesthetic only, vision + kinesthetic. Using a linear slide, subjects in the pre-informed group were told which mode of recall they would use, selected a position, and moved to it with both vision and kinesthesis available; then they had to recall the position in the pre-informed mode. This procedure was repeated 4 times for each of the 3 modes for a total of 12 trials (randomly ordered). The procedures were the same for uninformed subjects except they were unaware of the recall mode. Deviation from target was scored as AE, CE, VE, and |CE|, and analyzed in a 4 (age) X 2 (pre-informed vs. uninformed) X 3 (recall mode) MANOVA with appropriate follow-ups. The finding of major interest was an age X pre-informed - uninformed X response mode interaction for AE, $\underline{F}(6,174) = 2.34$, $p < .05$. This interaction indicated that pre-information for the recall condition was helpful in all modes for adults but had limited value regardless of recall mode for the younger age groups.

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April 14, 1981
11:15 a.m.

ACADEMIC LEARNING TIME IN COLLEGE PHYSICAL EDUCATION.

Michael W. Metzler, Iowas State University.

Academic learning time in physical education (ALT-PE) is defined as the amount of class time a student spends engaged in relevant instructional activities with a high success rate. Completed descriptive studies have shown that only about 25% of class time in grades K-12 is spent in ALT-PE. The purpose of this descriptive study was to determine the amount of ALT-PE accrued by students in activity classes taught on the college level. A second variable ALT-PE (M) was also examined in this study. ALT-PE (M) is the amount of class time a student spends in motor task engagement with a high success rate. ALT-PE in this study was measured in actual class settings, using an interval recording instrument. Observations took place in eight different activities. Three students were observed in each class, resulting in a total of 10,676 12-second intervals for analysis. It was determined that nearly 45% of all observed intervals were coded as ALT-PE in the college classes. This is almost twice as much as was coded in the K-12 classes. The amount of observed ALT-PE (M) in the college classes was 18.5%, once again nearly twice that of the K-12 classes.

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April 14, 1981
11:30 a.m.

COMPARISON OF THE USE OF THE ACTIVE GAME LEARNING MEDIUM WITH TRADITIONAL PROCEDURES IN THE DEVELOPMENT OF CERTAIN ARITHMETICAL OPERATIONS WITH SLOW LEARNING 7- to 8-YEAR-OLD CHILDREN.

James H. Humphrey, University of Maryland.

The purpose of this study was to determine how well comprehension of certain arithmetical operations could be developed through the active game learning medium with some of the traditional ways of developing comprehension of these operations. Twenty 7- to 8-year old children with IQs below 90 were divided into two groups of ten with one group designated as the active game group and the other designated as the traditional group. Both groups were pretested on two-number addition facts, three-number addition equations, and subtraction facts. One group was taught through the active game learning medium using activities in which arithmetical operations were inherent. The other group was taught by such traditional procedures as the printed number line, plastic discs, and abstract algorithms. Both groups were taught by the same teacher. Both groups were posttested ten days after the arithmetical operations were taught as indicated above. They were also given an extended interval test eight weeks after the posttest. There were significant gains from pre- to posttest to extended interval test in favor of the active game group. In recognition of various limitations imposed by a study of this nature any conclusions should be characterized by caution. If one accepts the levels of significant differences in the test scores as evidence of learning, these 7- to 8-year-old slow learning children could develop certain number operations, and perhaps retain them longer, through use of the active game learning medium than through some of the traditional procedures.

James H. Humphrey
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April 14, 1981
11:45 a.m.

INSTRUCTORS: ARE THEY IMPORTANT? Deborah L. Gebhardt, Advanced Research Resources Organization, Washington, D.C.; Patricia L. Kaylor, Adelphi University; Margarite A. Arrighi, University of Maryland.

The purpose of this study was to investigate the teacher effects in a methodology study. Two hundred twelve subjects received beginning tennis instruction from one of four participating teachers in either the traditional groundstroke teaching method with full grip or the volley teaching method with graduated length grip. Teacher bias was controlled by having each teacher implement both methods in separate classes. As an additional control factor all teachers followed a standardized sequence of instructions and time on task for each method. All subjects were pre- and post-tested on the Broer-Miller Forehand-Backhand Drive Test. The statistical design used was a 2x4x2 (methods x teachers x sex) MANOVA with repeated measures on the first and second factors. Results indicated that each teacher showed a preference for a particular teaching method suggesting that the success of a particular method was dependent on the instructor implementing that method. The findings also showed that it is difficult to statistically isolate the effect of methods since natural teacher variance cannot be partitioned from the main effects of methods. The interaction effects found in this study may offer some insight into the discrepancies found in the methodology literature. It is suggested that future methodology studies employ several teachers and require that all teachers implement each method under investigation. The statistical analysis utilized must complement the research design by allowing all possible main effects and interactions to be analyzed.

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April 14, 1980
12:00 noon

EXERCISE AND THE PSYCHOLOGICAL WELL BEING OF ADULT FEMALES

Linda J. Thurow Hallberg, Saint Xavier College.

It was the purpose of this investigation to determine the effect of a 10 week exercise program on the psychological well-being of adult females. One hundred and seventy-one adult females volunteered to participate in a 10 week program of either Body Conditioning or Aerobic Dancing. The women were classified by self-report as being in the premenopausal (N-132), menopausal (N-21), and post menopausal (N-18) biological stage of life. Each subject was administered a self-report inventory designed to determine the degree of life satisfaction and concern with self, both prior to and following the exercise program. Two three by two (3x2) ANOVA's were computed to determine if significant differences ($p <.05$) existed between the three biological life stages or as a result of the exercise program. A one-way ANOVA was computed for the menopausal group on a subscale of those self concerns previously associated with menopause (reported confidence level square to account for repetitive use of collected data). A Likert Scale was used to ascertain the life satisfaction (composed of needs regarding family, finance, friends, health, home, leisure time activity, marriage, occupation and spiritual well-being), and concern with self (areas surveyed were: coordination, change in regularity, changed bowel and bladder habits, a change in sight and hearing and the adjustments associated with the change of life).

The results of the present study supported the findings reported in literature that the elderly females would show greater satisfaction with life than the younger females. Contrary to hypothesis based on a review of the literature, the activity in the form of group exercise had no effect on any of the groups surveyed either in increasing life satisfaction or decreasing concern with self. There was no significant change brought about by the programs in the menopausal group specific to the symptoms of menopause, i.e., depression, hypochondria, sleeplessness, hot flashes, etc.

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April 14, 1981
12:15 p.m.

ACTIVITY LEVEL AND HDL-CHOLESTEROL IN POST MENOPAUSAL WOMEN.

Deborah L. Spiak, Priscilla M. Clarkson, Stephanie Jones.
Department of Exercise Science, University of Massachusetts, Amherst.

Cholesterol and lipoprotein levels were studied in relation to physical activity in postmenopausal women. Fasting blood samples were taken from thirty women past the stage of menopause (mean age 61.5 years). The sera were analyzed enzymatically for the concentration of total cholesterol (TC), and the percentage of high density lipoprotein (HDL) was determined using agarose gel electrophoresis. HDL-cholesterol (HDL-C) and TC/HDL-C were calculated from these variables. Questionnaires were completed on physical and personal characteristics, menopausal history, and the level of physical activity. Significant correlations were found between physical activity and percent HDL-C ($r = .71$, $p < .01$), and with the ratio of total cholesterol to HDL cholesterol (TC/HDL-C) ($r = -.66$, $p < .01$). No significant correlation was found between physical activity and TC. Due to both the inverse relationship between HDL levels and coronary heart disease (CHD), and the increase in the incidence of CHD in postmenopausal women, it is suggested that physical activity may be a protective mechanism against CHD in women past the stage of menopause.

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April 14, 1981
1:00 p.m.

HDL-CHOLESTEROL IN WEIGHT LIFTERS, RUNNERS, AND UNTRAINED SUBJECTS. Robert Hintermister, Priscilla M. Clarkson, Michael Fillyaw, Louis Stylos. Department of Exercise Science, University of Massachusetts, Amherst.

Serum total cholesterol, high density lipoprotein percent (HDL %) and high density lipoprotein cholesterol (HDL-cholesterol) were determined for 28 well-trained weight lifters, six distance runners, and 17 controls. Serum total cholesterol was determined enzymatically; high density lipoprotein percentage was determined by agarose gel electrophoresis. Total cholesterol and HDL % was similar in weight lifters (179.5 mg/dl and 29.7%) and controls (164.6 mg/dl and 32.0%) but significantly different in runners (126.4 mg/dl, $p < .05$ and 43.7%, $p < .01$). Also the total cholesterol/HDL cholesterol ratio was significantly lower in the runners (2.32, $p < .01$) compared with the weight lifters (3.44) and controls (3.37). It has been reported that increased levels of HDL% and HDL cholesterol, and decreased levels of total cholesterol/HDL cholesterol are associated with a decreased risk of coronary heart disease (CHD). Findings of the present study suggest persons involved in aerobic exercise demonstrate beneficially lower total cholesterol/HDL cholesterol levels while those involved in anaerobic exercise programs do not.

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April 14, 1981
1:15 p.m.

ACUTE EFFECTS OF MODERATE INTENSITY EXERCISE ON PLASMA LIPOPROTEIN PATTERNS IN MEN AND WOMEN.

Doris Lennon, Peter Hanson, Earl Shrago, Biodynamics Laboratory, University of Wisconsin-Madison.

Previous investigations have demonstrated an increase in the HDL-cholesterol level as a result of chronic endurance exercise. It was the purpose of this study to examine the effects of an acute episode of moderate intensity exercise on plasma lipoprotein patterns. Eight men and eight women performed an incremental resistance, constant speed, maximal aerobic capacity test on a bicycle ergometer. On a second occasion, each subject (12 hours fasted) exercised on the ergometer for 40 minutes at a resistance designed to elicit oxygen uptake of 55% of their maximal aerobic capacities. Blood samples were obtained via an indwelling catheter from the antecubital vein at rest, 10,20,30,40 minutes of exercise, and 15 minutes post exercise. Cholesterol determinations were performed via enzymatic methods. In men, mean total cholesterol values at rest were 158 ± 23.5 mg/dl and HDL-cholesterol 47.9 ± 8.51. These values increased @ 30 minutes of exercise to 168 ± 22.8 (6.33%) and 54.9 ± 8.08 (14.6%) for total and HDL-cholesterol respectively. LDL-cholesterol decreased from 97.9 ± 18.7 at rest to 91.9 ± 20.6 (6.13%) 15 minutes post exercise. In women, mean total cholesterol values at rest were 170 ± 36.6 and HDL-cholesterol 59.95 ± 16.1. These levels also increased by 30 minutes of exercise to 176 ± 32.4 (3.53%) and 65.4 ± 17.6 (9.09%) for total and HDL-cholesterol, respectively. The LDL-cholesterol fraction decreased from a resting level of 100 ± 25.6 to 91.4 ± 18.5 (8.6%) 15 minutes post exercise. The increase in the HDL-cholesterol fraction was significant in men ($P<.050$) and women ($P<.015$). It is concluded that plasma lipoprotein patterns are indeed affected by an acute episode of exercise. The significant rise in HDL-cholesterol accompanied by a fall in the LDL fraction may suggest an increased affinity of the cellular LDL-receptor mechanism. A description of the dynamics of lipoprotein pattern changes during exercise is critical if the mechanisms underlying changes in lipoprotein patterns resulting from chronic endurance exercise training are to be elucidated.

Supported in part by the Clinical Nutrition Research Unit of the University of Wisconsin - Madison, USPH 1P30 AM26659.

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April 14, 1980
1:30 p.m.

THE INFLUENCE OF HEMOGLOBIN CONCENTRATION ON EXERCISE CARDIAC OUTPUT.

Patty S. Freedson, University of California, Santa Barbara; Victor L. Katch and Robert J. Moffatt, University of Michigan; Stanley P. Sady, University of Nebraska at Omaha.

Two experiments were performed to study the cardiac output ($\dot{Q}$) hemoglobin concentration (Hb) relationship during constant load submaximum bicycle exercise. The first experiment examined the relationship between submaximum exercise $\dot{Q}$ and Hb in 28 females. A correlation of $r = -.83$, ($p < .05$) was observed between $\dot{Q}$ and Hb during exercise at 88 Watts ($\bar{X}\ \dot{Q} = 11.04\ \ell \cdot \min^{-1}$) and 118 Watts ($\bar{X}\ \dot{Q} = 13.10\ \ell \cdot \min^{-1}$) (steady-rate $\dot{V}O_2 = 1.40$ and $1.79\ \ell \cdot \min^{-1}$, respectively). By removing the influence of stroke volume (SV) from $\dot{Q}$, (part correlation analyses), the relationship between $\dot{Q}$ and Hb is compromised ($r = -.29$, $p > .05$, 88 Watts and $r = -.33$, $p > .05$, 118 Watts). The second experiment compared the $\dot{V}O_2$ max and submaximum exercise (118 Watts) $\dot{Q}$ responses in 6 males before and after blood donation. Experimentally decreasing Hb 18.6 percent ($p < .05$), caused a 6.2 percent decrease ($p < .05$) in $\dot{V}O_2$ max. Additionally, submaximum exercise $\dot{Q}$ increased 12 percent ($p < .05$) 6 days following hemodilution. The $\dot{Q}$ remained elevated 11 days (10 percent higher, $p < .05$) and 16 days (9 percent higher, $p < .05$) post blood donation and progressively returned to pre-donation levels by 21 days post-withdrawal. The higher $\dot{Q}$'s during submaximum exercise were ascribed primarily to an 8 percent higher SV ($p < .05$) in comparison to pre-donation values. Collectively, the data from the two experiments indicate that individual differences in submaximum exercise $\dot{Q}$ are due, in part, to individual differences in Hb concentration. It is suggested that the stimulus for the SV influence on the $\dot{Q}$ vs Hb association is related to maintaining maximal mycardial efficiency.

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April 14, 1981
1:45 p.m.

THE EFFECT OF RBC INFUSION UPON 5-MILE TREADMILL RUN TIME.

Melvin H. Williams, Old Dominion University; Sidney Wesseldine, Old Dominion University; Thomas Somma, Old Dominion University; Rudolph Schuster, Norfolk, Virginia.

The purpose of this experiment was to investigate the effect the infusion of 920 ml equivalent of autologous blood would have upon 5-mile time (5MT) and both local (RPE-L) and cardiovascular-respiratory (RPE-B) ratings of perceived exertion. Twelve long-distance runners undertook a series of four competitive 5MT trials on a treadmill. Four test conditions were utilized: pre-saline trial; post-saline trial after 920 ml saline solution; pre-blood trial; post-blood trial after 920 ml equivalent of whole blood. All subjects took all trials in this double-blind placebo crossover experimental design. Running time and RPE were recorded at each 0.5 mile split. Blood samples were taken before and after each trial. The data were analyzed via a repeated measures ANOVA. In general, the following results were noted following the blood infusion when compared with the other three trials: (1) a significantly higher hemoglobin (Hb) concentration; (2) a significantly lower RPE-L and RPE-B during the first two miles of the run; (3) a significantly faster 5MT. Within the limitations of this experiment, it was concluded that the infusion of 920 ml equivalent autologous blood would increase performance capacity in an athletic event characterized by high levels of aerobic energy expenditure.

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April 14, 1981
2:00 p.m.

THE CHRONIC EFFECT OF CAFFEINE AND EXERCISE ON MUSCLE GLYCOGEN STORES.

Anthony Wilcox, Kansas State University, Manhattan, KS 66506.

Recent research has demonstrated that caffeine consumption prior to endurance exercise can improve performance by its enhancement of fat utilization during exercise. Glycogen depletion is a major factor determining the onset of fatigue in prolonged aerobic exercise and the increased utilization of fat following caffeine consumption results in a sparing of muscle glycogen. The present study was designed to investigate the chronic effect of caffeine consumption prior to aerobic exercise on muscle glycogen levels in male Sprague-Dawley rats. Two groups of rats received daily oral doses of caffeine dissolved in saline (5 mg caffeine·kg body weight^{-1}): one group trained by swimming for 90 minutes ($n=9$) while the other group remained sedentary ($n=10$). Two groups of rats received doses of saline only, with one group swim-trained ($n=9$) and the other sedentary ($n=10$). The trained groups began swimming within 1 hour of receiving their dose. At the end of 10 weeks it was found that both exercise-trained groups (caffeine and no caffeine) had significantly higher soleus muscle glycogen levels than their sedentary counterparts ($p < .05$) while both of the caffeine-treated groups (trained and sedentary) had significantly lower muscle glycogen levels than their no caffeine counterparts ($p < .05$). Soleus muscle glycogen content was 3.80 and 2.50 mg glucose·g muscle^{-1} for the caffeine-trained and caffeine-sedentary groups, respectively, and 4.20 and 3.06 mg glucose·g muscle^{-1} for the no caffeine-trained and no caffeine-sedentary groups, respectively. Therefore, the ergogenic property of acute caffeine consumption for prolonged exercise may be nullified by lower initial muscle glycogen levels when caffeine is ingested before each training session. The glycogen-sparing effect of caffeine appears to remove the stimulus for increased muscle glycogen storage in the caffeine-treated rats, which would be detrimental in an acute bout of aerobic exercise.

This research was supported in part by a grant from Sigma Xi Scientific Society, New Haven, Connecticut.

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April 14, 1981
2:15 p.m.

RELATIONSHIP BETWEEN BODY FATNESS AND PERFORMANCE IN PREADOLESCENT CHILDREN.Larry D. Hensley, University of Northern Iowa; Whitfield B. East, University of Northern Iowa; Jim L. Stillwell, Pittsburg State University.

Performance differences between males and females have been attributed to both biological and cultural factors, although the relative significance of each is not easily ascertained. Differences in relative body fatness between males and females have been frequently mentioned as one biological factor responsible for variations in physical performance. In children, it has been shown that boys exhibit slightly higher performance levels than girls until adolescence when the differences favoring the boys become greater. The purpose of this study was to investigate the relationship between selected physical performance tests and body fatness in preadolescent boys and girls. Measures of age, height, weight, skinfold thicknesses at two sites, and performance scores on the vertical jump, standing broad jump, modified pullup, 40-yard dash, and 400-yard run were obtained on 564 elementary school children. The results of one-way ANOVAs indicated that there was a significant difference (p.$<$.05) between boys and girls on all of the physical performance tests. Although the boys were slightly taller and heavier and scored better on the performance tests, there was no significant differences between the sexes in percent body fat. Girls averaged 17.9% body fat, while boys averaged 17.0% body fat. Separate regression equations for percent fat by performance on each test were developed for each sex. These results indicated that, with the exception of the modified pullup test, percent body fat accounted for 4%-8% of the boys' variation on the various performances. For the girls, the performance variance attributed to percent fat was 1% or less. Only the modified pullup test was associated with a coefficient of determination sufficiently large to indicate that percent body fat was a practical determinant of performance. Percent fat accounted for 18% of the boys pullup test variation and 12% for the girls. These findings indicate that, although inversely related to the ability to move the body weight, relative body fatness is of minimal importance in explaining performance differences between young boys and girls.

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April 14, 1981
2:30 p.m.

CAUSALITY AND THE COHESION-PERFORMANCE RELATIONSHIP. Michael O. Wilkinson, Heather Barber, Brad D. Hatfield, and Daniel M. Landers. The Pennsylvania State University.

Despite numerous investigations which have been undertaken to determine directional causality, the relationship between social cohesion and sport participation has continually eluded clarification. Martens and Peterson (1971) argue that the relationship of these two variables demonstrates reciprocal causality for intramural basketball players whereas Carron and Ball (1977) provide evidence that among collegiate ice hockey players there is a stronger causal link from performance to cohesion than from cohesion to performance. Although Gill's (1977) review of this literature suggests greater support for successful performance causing greater cohesiveness, she maintains that this trend is far from conclusive. The purpose of the present study was to test the contrasting causal models proposed by Martens and Peterson (1971) and Carron and Ball (1977). This was done by employing for the first time statistical procedures that are specifically designed to test a priori predictions of causal relations in each of the models. Subjects were male college students (N=71) participating in a graduate basketball league at The Pennsylvania State University. Performance and cohesiveness measures were obtained at the beginning of the season, middle, and at the end of the 7-week season. Results of the path analysis supported the predictions of Martens and Peterson's (1971) "reciprocal causality model." The two paths predicted to be zero in Carron and Ball's (1977) "one-way causality model" were in fact significant (cohesiveness$_1$ → performance$_2$, $\underline{r} = -.52$, $\rho < .05$; cohesion$_2$ → performance$_3$, $\underline{r} = -.51$, $\rho < .05$). The paths from performance to cohesion were also significant (performance$_1$ → cohesion$_2$, $\underline{r} = -.59$, $\rho < .05$; performance$_2$ → cohesion$_3$, $\underline{r} = -.46$, $\rho < .05$) and of approximately the same magnitude as the cohesion to performance paths. A cross-lag panel correlation analysis also supported the reciprocal influence of cohesiveness on sport performance and vice versa. The results are discussed in terms of the current research and models of cohesiveness/sport performance as well as the practical applicability of these findings for sport practice.

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April 14, 1981
3:00 p.m.

ORIENTATION TOWARD WINNING AS A FUNCTION OF ATHLETIC PARTICIPATION, GRADE LEVEL, AND GENDER.

Ansel P. Card, University of Utah.

The purpose of this study was to determine differences, if any, in subscription to a winning attitude between the various groups under investigation as indicated by transition from one scale component (fairness, skill, and success) to another. A subproblem was the determination of differences, if any, which exist between genders, grade levels, and individual and team sport participants in relation to one's orientation toward winning. A total of 1417 respondents were solicited from the University of Utah and Salt Lake County, Utah public schools representing grades kindergarten through college. Webb's Professionalization of Attitude Scale and an accompanying personal data sheet were administered to each subject comprising the total pool. In both of the three-factor designs, the rejection level was set at the .10 level of significance. The Duncan Multiple Range Test was utilized in order to locate significant main effect mean differences, and simple main effect analyses were conducted for significant interactions. In general, the results demonstrated that: (1) males reported significantly ($p < .001$) higher mean scores than did their female counterparts; (2) as grade level increased so did one's attitude toward winning ($p = .003$); (3) athletes scored significantly ($p < .001$) higher than did nonathletes; and (4) no significant ($p < .10$) differences existed between team and individual sport participants. The following conclusions were drawn: (1) prior to athletic exposure (kindergarten grade level) it appears that athletes and nonathletes do not differ in their orientation toward winning; (2) grade level did have an effect upon formation of one's orientation toward winning, but it is not until the ninth grade that any relative trend develops with the major emphasis shift being from fairness to skill acquisition; (3) females are more concerned with fairness as the paramount element of participation, whereas males stressed skill development and winning as the most important elements; (4) athletes place more emphasis upon skill acquisition and victory and the nonathletes stress fairness as the utmost element of participation; and (5) it appears that participation itself is more responsible for winning orientation than is the type of sport involvement (individual or team).

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April 14, 1981
3:15 p.m.

FAMILY CHARACTERISTICS AND PARTICIPANT BACKGROUND OF HIGH LEVEL ATHLETES: THE 1980 EMPIRE STATE GAMES.

Jerry Freischlag, Canisius College and Thomas Sheeran, Niagara University.

Characteristics of family units have long been acknowledged for their interactions with high level athletic accomplishments. Relative contributions of birth order, family size and social status to sport success have yet to be established. Also regularly debated and not fully understood are a host of personal background factors associated with athleticism. To examine these and other relationships, a questionnaire was developed and administered to athletes from 25 sports of the 1980 Empire State Games. This New York State-wide Olympic-type program conducts yearly qualifying and final competitions for male and female athletes in scholastic and open divisions. Data collected from 3443 athletes were coded and analyzed by an SPSS computer program. Descriptor variables permitted construction of athlete profiles for each sport, sex, and division. Cross tabulations were conducted of each sport by school achievement, parent education, family income, community size, family composition, and scope of sport involvement. Overall, athletes were found to rank high academically, come from upper middle class families, and reside in a large village or small city. Athletes were usually one-sport specialists and early-born in a moderate to small sized family unit. Variability among the 25 different sports was sometimes extreme and will be discussed. The Empire State Games provided a unique opportunity to secure demographic data from a large pool of athletes representing a broad spectrum of sports. Findings are useful in describing sports previously not examined such as canoe, kayak, and synchronized swimming. Generalizations developed previously from small samples of athletes are tested by the present findings.

Jerry Freischlag
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April 14, 1981
3:30 p.m.

PARENT-CHILD RELATIONS AND ORIENTATIONS TOWARD SPORT. Mary A. McElroy, Kansas State University

Same sex (mother-daughter; father-son) and cross sex (mother-son; father-daughter) parent child relations were examined with regard to whether these social interactions were differentially related to children's orientations toward sport. " Winning " and " achievement " were defined as traditional male sport orientations while " fair play " and " everyone participates " were viewed as traditional female sport orientations. A theory of parent-child interaction was developed that suggested parents as a result of their own sex role socialization transmit their own sex value orientations onto their children, thus, reinforcing sex linked sport orientations in their same sex children while non sex linked sport orientations in their cross or opposite sex children. Specifically, it was hypothesized that 1) fathers' support is related to more traditional male orientations in their daughters and 2) mothers' support is related to more traditional female orientations in their sons. 898 male and 800 female youngsters ($\bar{X}$ = 11.8 years of age) who participated in a nationally sponsored youth sport program were asked to identify their value orientations toward sport as well as their parent significant other. The analysis revealed that mother-son relationships were associated with more traditional female sport orientations in boys, however contrary to expectation, father-daughter relationships were also related to stronger female sport orientations in girls. Explanations for why both parents may reinforce traditional sex linked orientations in their daughters, but not their sons were discussed.

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April 14, 1981
3:45 p.m.

THE EFFECT OF FEEDBACK AND INDIVIDUAL-GROUP CONTINGENCIES ON THE TEAM BEHAVIORS OF AN INTERCOLLEGIATE BASEBALL TEAM.

Paul C. Paese, Southwest Texas State University.

The purpose of this study was to evaluate the effect of feedback and individual-group contingencies on the team behaviors of a college baseball team. Feedback to team and individual players was in the form of verbal feedback and public record, which is the posting of team and individual averages on the team board. The study consisted of a baseline phase, an intervention of feedback, and a second intervention adding individual-group contingencies to feedback. The data were analyzed via a multiple baseline design across five behaviors. Reliability was measured by using the interval by interval method of calculation. Total reliability average for all coders was ninety-three point four percent. The results indicated that all five team behaviors showed a behavior change in the desired direction when looking at the dependent variables mean efficiency average following the intervention of both independent variables. The following conclusions are justified:

1. Changes in the dependent variables occurred in the desired direction.
2. An increase in the dependent variables following interventions did lead to a higher winning percentage when compared to baseline.
3. Feedback (public record) proved to be a successful independent variable when looking only at the greatest increase in total mean efficiency average from one phase to the next in all five team behaviors.
4. Individual-group contingencies proved to be successful when looking only at the fact that team efficiencies for each of the five team behaviors was raised to their highest mean average of the year during this particular phase of the study.
5. A combination of individual-group contingencies plus feedback seems to be the strongest intervention when looking to increase team performance and to increase team success.
6. Behavioral reinforcement programs are successful, and its use in the sport environment does lead to an increase in team performance.

ACKNOWLEDGEMENTS: I would like to thank Dr. Daryl Siedentop (Ohio State University) for his help in constructing the observational instrument used to collect data in this study.

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April 14, 1981
4:00 p.m.

RISK TAKING: A FIELD STUDY OF BASKETBALL. Robert W. Johnson, Betty C. Kelley, and Constance D. Foster, University of Minnesota.

The purpose of this investigation was to examine score differential (point spread), period of play, and frequency of play (number of plays per quarter) as factors related to risk-taking behaviors in competitive senior high school girls basketball. The behaviors of 5 players were monitored across 13 regular season games. These behaviors were categorized as either percentage play, over-risk (forcing shots, passes, over-aggressive defensive play, etc.) or under-risk (needless stopping of a fast-break, failure to take the good shot, etc.). Over-risk and under-risk scores were computed as percentages of total play and these scores were added to obtain a total risk score. Multiple regression procedures were applied to each of the risk scores. Significant multiple correlation coefficients were obtained in the over-risk analysis alone (multiple R = .542, significant at the .01 level). The beta weights computed for over-risk included -.506 for point spread, .465 for quarters and -.072 for frequency of play. The negative relationship between point spread and over-risk indicated a tendency for the amount of over-risk behaviors to increase as score differentials decreased and vice versa. It was argued that low score differentials are arousal inducing and serve to limit the subjects' ability to select and initiate the appropriate behaviors associated with percentage play. Such an argument dovetails nicely with the observations of researchers concerned with the effects of activation on motor behavior. The positive relationship between period of play and over-risk indicated a tendency for over-risk behaviors to increase as play progressed. Past research has indicated a tendency for subjects to accept more risk as physical exertion is prolonged and fatigue occurs. Because the effects of score differential become accentuated in later quarters of play, the interaction between activation, fatigue, and risk-taking behaviors was also considered.

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April 14, 1981
4:15 p.m.

THE CONTRIBUTIONS OF BLANCHE M. TRILLING TO THE ESTABLISHMENT OF THE WOMEN'S DIVISION, NATIONAL AMATEUR ATHLETIC FEDERATION.

Mary L. Remley, Indiana University.

In relating the history of the founding of the Women's Division of the National Amateur Athletic Federation, authors have consistently lauded the efforts of Lou Henry Hoover as the chief figure in the early promotion of that organization. She is cited as the person who got the women organized, called the first meeting of April 6 and 7, 1923, was elected permanent Chairman, and was a strong force in the decline of competitive athletics for women in the 1920s and 1930s (Gerber, et al, 1974; Sefton, 1941; WomenSports, September, 1974). Mrs. Hoover was a well known figure at the time; she was the wife of then Secretary of Commerce, Herbert Hoover and the President of Girl Scouts, Inc. As the only female member of the Board of Governors of the recently organized NAAF, she was the logical candidate for organizing a women's division of the Federation when interest developed in the promotion and control of girls' and women's sports. Although Mrs. Hoover's work in the actual founding of the Women's Division has been well documented, that of other prominent women leaders is far less evident. In particular, the role of Blanche M. Trilling in the initiation, establishment, and early work of the Women's Division has largely been ignored. At the time the Women's Division was founded, Miss Trilling was Chairman of the Women's Athletic Section of the APEA, a position that provided some opportunity to exert influence in women's sports. Yet, very little information suggests her involvement in the early work of the Women's Division. Relying primarily on personal correspondence from historical files at the University of Wisconsin and information from the NAAF files in the AAHPERD Archives, this study examines the founding of the Women's Division focusing on individuals who played a significant role in its establishment. Specific attention is given to the contributions of Miss Trilling. Evidence suggests that Miss Trilling was, in fact, a dominant figure in the early development of the Women's Division and, to a large extent, initiated many of the actions implemented by Mrs. Hoover.

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April 14, 1981
4:45 p.m.

THE VIEWS OF CHARLES W. ELIOT ON THE RELATIONSHIP BETWEEN PHYSICAL EDUCATION AND EDUCATION.

Alar Lipping, Miami University, Oxford, Ohio.

American education during the post-Civil War era witnessed an enormous transformation. The content of the curriculum was modified to meet the needs of a rapidly changing American society, and by the early 1900s, all levels of American education had been reformed. One of the most influential reformers during this period was Charles W. Eliot, president of Harvard University. During his forty year tenure, 1869-1909, as Harvard's president, and seventeen years following his retirement, Eliot loomed large in the affairs of American education. This paper examines Eliot's conception concerning the significance of physical education in the conduct of American education. A review of primary sources housed in the Harvard University archives revealed that Eliot advocated required programs of physical education for elementary and secondary levels of education. He contended that physical education contributed to the development of a student in three ways: (1) lifetime sports for an individual to lead a long, healthy, and happy life; (2) team sports for training in cooperative behavior; and (3) physical development for productive efficiency and military preparedness. Eliot supported programs of physical education in higher education. He praised Dr. Dudley A. Sargent's work in establishing a scientific foundation for physical education, and he was supportive of the Harvard Summer School of Physical Training. President Eliot allocated funds for Dr. George W. Fitz to establish the first exercise physiology laboratory in the United States. In 1891 Dr. Sargent and Dr. Fitz collaborated to establish the nation's first degree program in physical education at the Lawrence Scientific School of Harvard University. President Eliot supported the efforts of Drs. Sargent and Fitz in improving the quality of physical education in the United States. Although Eliot favored programs of physical education in higher education, he did not support compulsory physical education in higher education, nor was he supportive of rewarding college credit for physical education.

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April 14, 1981
5:00 p.m.

AN HISTORICAL OVERVIEW OF MADISON SQUARE GARDEN WITH IMPLICATIONS TO SPORT AND SOCIETY.

Stephen J. Virgilio, University of New Orleans.

The purpose of this study was to trace the historical development of Madison Square Garden and indicate its effect on sport and society. Stadiums, arenas and coliseums have played a significant role in the development of sport, as well as the sociocultural process in this country. To gain further insight into this role, an historical analysis of Madison Square Garden was made in this study, utilizing primary and secondary sources.

From a four acre plot of parkland set aside in 1836 in Manhattan came Madison Square, named after James Madison. In 1873, Barnum rebuilt it adding walls and wooden seats. In 1879 Commodore Vanderbilt named it Madison Square Garden. It was then used primarily for riding, archery and lawn tennis. Winter weather caused complications and in 1884 the Garden was sold. Stanford White designed a new facility and the old one was destroyed in July 1889. Garden II had a seating capacity of over 8,000. Events such as boxing, wrestling, bike races and basketball were popular. In 1913 the New York Life Insurance Company became the owner. In 1918 boxing was revived and Charles Rickard staged a match between Jess Willard and Frank Moran. The gate was $152,000, the largest in the Garden's history. By 1923, business was booming and a larger facility was needed. Garden III was planned, located on 8th Avenue. It seated 18,000 and was built along practical lines with large events in mind. Several years later came the depression and a decade leading to WWII. It was a time of college basketball, doubleheaders, track meets, and a boxer named Joe Louis. In 1960 Irving Felt announced that Garden IV would be constructed. On February 13, 1968 the fourth Garden began operation located above Penn Station at 33rd Street. The first sports event was an N.B.A. basketball game on February 14 where New York beat San Diego. It was concluded that the historical development of Madison Square Garden gave impetus to the role of the large athletic facility in this country. Furthermore, it set a precedent on the effect it had on the sociocultural process of people in a large city and the part sporting events played in the development of their lives and their country.

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April 14, 1981
5:15 p.m.

A CASE STUDY OF THE ETHNIC DIMENSION IN SPORT: HANK GREENBERG AND THE MEDIA. William Simons, State University of New York at Oneonta.

This research paper analyzes media depictions of baseball's premier Jewish standard bearer, Hank Greenberg, during the 1930's. After surveying the general status of ethnicity in press coverage of Thirties baseball, recurrent images of Greenberg are identified. Then, the focus shifts to the journalistic controversy surrounding Greenberg's decision to play baseball on the Jewish New Year in 1934. Finally, the implications of Greenberg's image for fellow ethnics received attention. This paper will demonstrate the assimilationist connotations of this image. Detailed examination of Thirties' print media, including the Anglo-Jewish press, sporting publications, national magazines, contemporary books, and general circulation newspapers from all cities with major league baseball teams, provides the empirical base for the content analysis that follows. The assimilationist implicationists of Greenberg's press image coincided with aspirations harbored by many Jewish Americans during the Depression era. As progeny of immigrant parents, many Jews of this period belonged to the second generation. The second generation, ambivalent about its religious heritage, eager to acquire middle-class respectability, and anxious about the opinion of the Gentile community, found Greenberg an appropriate standard bearer. Unlike the often flamboyant, poorly educated, financially imprudent Jewish boxers, who flaunted their ethnicity with the Star of David emblazoned on their trunks, and carried the ambience of ghetto pugnacity with them, "modest," "retiring," "clean-living" Hank Greenberg, as portrayed by the press, was an Americanized _mensch_. The Greenberg of the media, who eschewed calling attention to his private religious beliefs, offered fellow Jews an example of an upwardly mobile lifestyle that attracted relatively little animosity from Gentile neighbors. The New York _Evening Post_ in 1934, for example, linked Greenberg's personal success with the movement of Jews out of the Lower East side ghetto. Newspaper photographs of the articulate Greenberg, who had attended New York University for a year, often displayed a neat, immaculate gentleman, dressed in tie and jacket with a newspaper in hand and resembling a young professional or businessman more than he did a baseball player. Both the Anglo-Jewish and general circulation press perceived Greenberg as the most exemplary of the Jewish standard bearers.

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April 14, 1981
5:30 p.m.

SPECULATIONS ABOUT POSSIBLE INFLUENCE OF THE ITALIAN RENAISSANCE CALCIO ON ENGLISH FOOTBALL. Carmelo Bazzano, Boston State College

The purpose of this paper is to examine influences of the Italian Renaissance Calcio on English Football. When various attempts were made in the second part of the XIX century to codify the rules of football in England, public schools were heavily represented. Finally agreed upon rules were applied in the first international match held between Scotland and England in 1872. During this match both teams dispersed their players in three lines. Scaino in his "Trattato del Gioco della Palla" described (1555) the rules of the game of Calcio, among rules mentioned he stated that the players were distributed in three lines. It was hypothesized that probably there had been some influence by the Renaissance Calcio on the football played in the English public schools because rules enforced in the international game represented the majority of the rules used in games played on the schools' fields. The Renaissance influence in England was pervasive from the beginning of the XV century to the death of Elizabeth I. Uncovered evidence suggests the following generalizations: 1. It was fashionable in the XV and XVI century for the educated Englishman to take a trip to Italy to complete his education. This is similar to what happened in Rome after the conquest of Greece. The well-to-do Romans flocked to Athens to put the finishing touches on their education. Some sport historians in Italy have advanced the theory that as the Romans in sports learned from the Greeks so the Englishmen learned from the Italians. 2. Guarino Guarini, a Renaissance teacher, wrote about the "English nation" (English students studying in Italy). Guarino was an advocate of physical activity, and a professor at the University of Padua, where Scaino resided. 3. Scaino reported about conversations of foreign students at Padua. The students argued about which game was superior, lending support to the theory that foreign students participated in the sporting life of the University. 4. Prior to the Italian influence, the English game was "a free-for-all" with participation of an unlimited number of players, undistinguished by role. 5. Mulcaster wrote on the mental and physical benefits of physical activity. He gave a detailed description of the game football. He borrowed freely from the works of Italian educators especially from the "De Arte Gymnastica" of Mercurialis who wrote about ancient games being played in Italy. Football was one of the games described. Mulcaster was influential in shaping the curriculum of the public schools. Circumstantial evidence? Perhaps, yet what has been uncovered cannot be dismissed as inconsequential evidence. Further research is necessary.

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April 14, 1981
5:45 p.m.

THE CONCEPT OF IDENTITY AS AN UNDERLYING THEME IN AMERICAN SPORT HISTORY. Nancy L. Struna, University of Minnesota.

Any synthesis of the development of sport as a social institution in America invites analysis, an explanation of why sport developed as it did. At least since the beginning of this century, historians have proposed numerous interpretations to explain the "rise of sport" in varying time periods. Among others Frederic Paxson argued that the close of the frontier was responsible for the twentieth century boom; John Betts tried to establish industrialization as the major causal factor behind the appearance of "modern" sport; and most recently, Allen Guttmann discussed various interpretations and dispensed with all but one in suggesting that the why of sport's development relates to its cultural base. Although none of these interpretations appear to be entirely incorrect, neither is any sufficiently inclusive and precise. Popular perceptions of the frontier and industrialization may in fact have affected the development of sport, but neither is or was the cause. Rather, because each of these, as well as other factors, is the result of people's actions and attitudes, the frontier and industrialization must first be seen as effect, not cause; consequently the historian must explore the thoughts and actions of people to find the elemental explanation for sport, as well as for the close of the frontier and industrialization. The records of many generations of Americans do, however, suggest this elemental, underlying explanation. When the historian asks two related questions -- why man has sported as he has and why attitudes and practices developed as they did -- a complex, comprehensive idea manifests itself: the concept of identity. Defined as one's perceptions of his/her rights and interests, the concept of identity encompasses varying human motivations (catharsis, health, economic gain), and it serves as the basis for man's reactions to and actions upon the environment and social institutions. In essence Americans have practiced the forms of sport, joined clubs, participated as individuals, professionalized, and glorified amateurism, among other behaviors and beliefs, because they needed to define themselves, individually and collectively. From the colonial period to the present, American sportsmen and women participated or refused to allow others to participate, conceived and promoted a range of attitudes, and practiced forms of sport which enabled them to distinguish themselves, lose themselves, or "belong", either in concert with or in contrast to others in American society or in other societies.

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April 14, 1981
6:00 p.m.

UNDERWATER MANUAL DEXTERITY IN THE OPEN OCEAN. P. A. Hancock and E. Keith Milner, University of Illinois, Urbana-Champaign.

Six experienced male SCUBA divers performed tests of manual dexterity in the open-ocean underwater environment. Each test consisted of an assembly and disassembly of bolt combinations, where size of combinations was varied. For the two combinations, a similar decrement of speed performance was found for a shallow (3.7m) exposure (31.0%) over a land control. For a greater depth (15.3m) the larger combination resulted in a greater percentage decrement (58.5%) than the small bolt combination (36.0%). Absolute task completion time was always less for the larger combination. These results are compared with previous data concerning manual dexterity in the open ocean. An overall view suggests that a quisa-linear relationship exists between depth and percentage increase in completion time for manual tasks underwater.

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April 15, 1981
8:15 a.m.

ACQUISITION, RETENTION, AND TRANSFER PARAMETERS FOR CONTEXTUAL INTERFERENCE EFFECTS. John B. Shea, University of Colorado; Robyn Morgan, University of Colorado; Linda Ho, Southern Illinois University.

This study consisted of a replication and extension of Shea and Morgan's (1979) recent study investigating Battig's (1979) conceptualization that increased contextual interference during skill acquisition can lead to improved retention or transfer, especially under changed contextual conditions. Subjects learned three similar motor tasks in either a blocked condition (all acquisition trials given in a blocked sequence), a random condition (all acquisition trials given in a random sequence), a blocked-random condition (a blocked sequence for the first half and a random sequence for the second half of acquisition trials), a random-blocked condition (as in the blocked-random condition, but the order of practice sequences was reversed), or a mixed condition (alternating blocked and random practice sequences over six blocks of trials). Retention and transfer performances were measured after a 10-min retention interval under both blocked and random testing sequences. In addition, subjects were administered paper and pencil recognition and recall test. All groups receiving random practice, regardless of where in acquisition this practice occurred, had faster performance times, and made fewer errors, than the subjects who received only blocked practice during acquisition. Groups receiving random practice during acquisition correctly recalled and recognized a greater number of acquisition and transfer tasks than the blocked group. These findings provided support for earlier findings (Shea & Morgan, 1979) and showed that the point of interpolation, as well as the relative amount of contextual interference during acquisition, was not a major determinant of subsequent retention and transfer performance.

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April 15, 1981
8:30 a.m.

FORCE PRODUCTION TRANSFER AS A RESULT OF PRACTICE SCHEDULE.

Dale G. Pease, Iowa State University; David A. Ludwig, University of Cincinnati.

In testing schema theory, little attention has been given to force production. College age subjects (n = 48), all right-handed, performed a shuffle board type task involving the non-dominant arm being strapped to a kinesthesiometer type device with a cup mounted at the wrist position to craddle a steel puck. The puck, with a short extension movement (30 degrees), was propelled at a target placed equal distance from all possible points of release. The objective of the task was to hit a 4-cm. target while trying to maintain a puck travel time of 400 msec. from point of release to target. Arm movement time for the task averaged 167 msec. Upper and lower torso restraints were used to eliminate extraneous body motion. Subjects, randomly assigned to two experimental groups (n = 16/group) performed 80 training trials and 20 transfer trials. The variable practice group trained using four different weights in a pre-established random order while the nonvariable practice group trained with only one weight. The transfer task used a weight different from the training weights. Since subjects were blindfolded, KR involving accuracy and timing was given verbally after each trial. A control group performed only the transfer task receiving KR. A MANOVA was performed on groups, blocks, and group by block effects for AE, VE, and CE for transfer data. The $\underline{F}$ approximations for all effects were significant ($p < .01$). The group by block interaction was significant for AE and VE, but not for CE. Single degree of freedom orthogonal comparisons arising from polynomial regression showed the linear effect for variable and nonvariable practice groups to be equal for AE and VE, $\underline{F}_{AE}(1,45) = .326$, $\underline{F}_{VE}(1,45) = .590$. Most of the variation for the group by block effect was due to the linear interaction of the control group verses the two experimental groups, $\underline{F}_{AE}\ (1,45) = 18.02$, $\underline{F}_{VE}\ (1,45) = 10.80$, $p < .01$. The results suggest that practice involving several weights (variable practice) did not enhance the performance on a transfer task which required only a change in force production. Therefore, the prediction of schema theory suggesting a variable practice schedule will facilitate transfer was not supported.

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April 15, 1981
8:45 a.m.

RAPID ERROR CORRECTIONS: EVIDENCE FOR INTERNAL FEEDBACK.

Virginia A. Diggles, University of Wisconsin.

The phenomenon of rapid error corrections has been observed in step tracking and choice reaction tasks (CRT) where errors in direction are corrected in less time than response latencies to external stimuli. The explanation offered is that errors are detected centrally via the efferent copy of the motor command, even before the movement has begun. Therefore corrections are not in response to the external consequences of the error but to its specification in the efferent command. An equally plausible and simpler explanation of rapid error corrections has been put forward recently stating that they represent false anticipations shich reduce the task from two choices to one, the correction latency representing a simple RT plus a refractory period due to a prepared response. To distinguish between these two explanations, performance on a two choice RT task involving high (patterned order with reversals on 8-10%of trials) and low (random) anticipation of directional stimuli was compared with performance on a passive error correction task under similar levels of anticipation in a within-subject design (n=12). The passive error correction task emulated the active condition except that movement was passively induced; no response was required unless the movement was in the wrong direction relative to the stimulus. Internal feedback notions would predict slower error correction times (ECTs=time from stimuli to correct reversal for the passive task relative to the active; whereas the false anticipation hypothesis would predict the opposite result, since refractoriness is eliminated. Correct RTs, error RTs and ECTs were compared between anticipation levels and between tasks. In the active task, error RTs and ECTs under high anticipation were slower, indicating that anticipation is not the cause of errors nor does it contribute to their short latencies. Errors generated by the subject on patterned trials (no reversal) had faster RTs than on errors occurring on pattern reversals, suggesting that short latencies occur when error is generated internally, independent of anticipation. The critical comparison between active and passive ECTs found active corrections to be faster than passive corrections, indicating that the internal monitoring of the efferent command is essential for rapid corrections. These findings support the conclusion that rapid error corrections represent the temporal benefit of monitoring internal feedback loops in the central nervous system.

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April 15, 1981
9:00 a.m.

SENSORIMOTOR PERFORMANCE AND LIMB PREFERENCE. Geraldine K. Lofthus, University of California at Berkeley.

The purpose of this study was to examine simple and choice fractionated reaction time components with respect to limb preference. Subjects (10 males, 10 females) participated in two experiments. The first experiment involved three sessions of sensorimotor performance of the hands under four conditions of preferred only, nonpreferred only, bilateral simultaneous, and choice hand grip reaction time. Experiment 2 involved preferred and nonpreferred knee extension under the same conditions. Statistical comparisons were made from the last test session of each experiment. Under the simple reaction time situation, only the preferred bilateral hand reaction time and corresponding motor time were significantly longer than any other performance measure. All performance differences for simple leg reaction times (Experiment 2) were nonsignificant. Sex differences were not present for simple hand or leg reaction time performance. Under the choice reaction time situation, results for hand and leg performance were similar, i.e., fastest reaction times and premotor times were associated with unilateral performance. Females displayed faster hand choice reaction time scores than males, while no difference occurred between sex groups for simple and choice leg comparisons. On the basis of these findings, it would appear that sex differences for reaction time performance are a function of task complexity (simple vs. choice) and responding limbs (hands vs. legs).

This investigation was supported by BRSG Grant RR-7006--from the Biomedical Research Support Program, Division of Research Resources, National Institutes of Health.

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April 15, 1981
9:15 a.m.

EFFECT OF CONTEXTUAL STIMULI ON COINCIDENCE-ANTICIPATION PERFORMANCE AFTER EXTENDED PRACTICE. Kathleen M. Haywood, University of Missouri--St. Louis.

The class of skills termed "coincidence-anticipation tasks" have typically been viewed by physical educators in an information processing context. An information-processing view of perceptual-motor performance, such as that described by Welford, holds that the processes involved in perception are organizational and depend on past experiences. In motor tasks which require anticipation an individual uses past experience to predict what may happen. Yet bias effects in perceptual judgments, including bias caused by contextual stimuli, have been well documented, and may explain the significant differences in coincidence-anticipation performance due to stimulus speed so often found in previous research. The problem of this study was to observe the relationship between stimulus context and performance on an anticipatory motor skill after extended practice by skilled subjects. Two groups of 20 women athletes each were tested for 270 trials over 3 days, one group at stimulus speeds of 2, 3, and 4 MPH and the other at 2, 4, and 6 MPH, on a Bassin Anticipation task. Following a warm-up of 30 trials on Day 4, the second group was transferred to the same stimulus speeds given the first group. Speed X block (3 X 9) ANOVAs of constant, absolute, and variable error showed that each group improved during the training trials, although the pattern of improvement was not identical in the two groups. Both groups demonstrated a significant tendency to respond late as well as less accurately and more variably to the slowest speed. Group X speed X block (2 X 3 X 2) ANOVAs of constant, absolute, and variable error were calculated for the transfer blocks, the last 2 blocks on Day 4. The groups performed similarly except that the transferred group was significantly later in responding to the slowest speed in Block 1 alone. A significant speed factor for constant error and individual trial means indicated subjects were influenced by contextual stimuli. When a 2 MPH stimulus was preceeded by a 3 or 4 MPH stimulus, the response was late; when a 4 MPH stimulus was preceeded by a 2 MPH stimulus, the response was early. Bias effects therefore seem to persist, even after extended practice.

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April 15, 1981
9:30 a.m.

THE EFFECT OF SPEED AND TARGET SIZE SHAPING ON THE ACQUISITION OF A SIMPLE MOTOR SKILL.

Paul Dunham, Jr. and Gary Frens, University of Wyoming.

The purpose of this study was to investigate the effect of systematically shaping the speed and target size (accuracy) on the acquisition of a simple teaching skill. Forty undergraduate male right-handed volunteers served as subjects for this study. Subjects were randomly assigned to one of four practice groups: control, size variability, speed variability and/or interaction. The subjects practiced pursuit rotor trials until they reached the criterion of 70 percent time-on-target twice in succession. The control group practiced at 40 rpm's with the small target; the size variability group practiced at 40 rpm's with the large, medium, and finally the small target; the speed variability group practiced with the small target and speeds of 10, 20, 30, and 40 rpm's. The interaction group practiced with the large, medium and small targets at speeds of 10, 20, 30, and 40 rpm's. A subject's score was recorded as the total number of trials required to achieve the criterion of 70 percent time on target at 40 rpm's. Results indicated a significant difference between groups with the interaction group significantly less effective than other practice groups. The results were interpreted to concur with the previous findings of Dunham and Kell (1980) that, contrary to contemporary practice in physical education, no evidence supported the superiority of shaping acquisition of this continuous motor skill. The findings were discussed in terms of previous research on shaping and the theory of task specificity.

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April 15, 1980
9:45 a.m.

EFFECTS OF IMAGERY ABILITY AND INSTRUCTIONS ON RECALL OF SPATIAL-LOCATION INFORMATION.

Lynn D. Housner and Shirl J. Hoffman, University of Pittsburgh.

The purpose of the study was twofold: (1) to investigate the role of visual imagery ability in short-term retention of spatial locations (SLs), and (2) to examine the effects of imagery instructions on recall accuracy of SLs for subjects classified as high (HIGHS) or low (LOWS) in visual imagery ability. The space relations section of the Differential Aptitude Test was administered to one hundred and fifty volunteers. Eighteen HIGHS and eighteen LOWS representing extreme high and low scorers on the test were selected for the study. Subjects were required to reproduce six SLs in each of six reproduction conditions: immediate reproduction, 10, 20, 30, and 40 second unfilled retention intervals and a 30 second imaginal distraction condition which required subjects to formulate competing visual images. For each imagery ability group, half of the subjects were given instructions to employ an imaginal rehearsal strategy, while the others received no rehearsal instructions. SLs were reproduced on a curvilinear arm positioning device with error scores recorded to the nearest .10 of a degree. Three indices of movement error, AE, CE and VE were analyzed in a 2 x 2 x 6 (imagery ability x imagery instructions x reproduction condition) ANOVA for repeated measures. Significant imagery ability main effects for AE, $p<.0001$ and VE, $p<.005$ were observed; HIGHS reproduced SLs with less error than LOWS. Reproduction main effects for AE, $p<.0001$, CE, $p<.009$, and VE, $p<.003$ indicated that the imaginal distraction condition disrupted recall performance. However, no interactions were observed indicating that HIGHS given instructions to image performed no differently than HIGHS who weren't. While the findings point to the functional significance of visual imagery in the short-term retention of spatial-location information, there was no evidence to support that imaginal strategies were induced by instructions to image.

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April 15, 1981
10:00 a.m.

INCREASED LATENCY FOR COMPLICATED MOVEMENTS: MEMORY DRUM THEORY REVISITED.

Robert W. Christina, Mark G. Fischman, Pennsylvania State University; J. Greg Anson, Cumberland College of Health Sci.

The "memory drum" theory of neuromotor reaction (Henry & Rogers 1960) predicts that as the complexity of a gross motor response increases, simple reaction time (SRT) also increases. Complexity was implicitly defined as the addition of connected movement parts or changes and reversals in direction. Henry & Rogers (1960) claimed support for the theory from an experiment involving three responses which varied in complexity from a simple finger lift (Response A), to a moderately complex single ball-grasp task (Response B), to a highly complex double ball/button task (Response C). Mean SRTs of 163, 195, and 204 msec were reported for the A, B, and C responses, respectively. The increases in SRT were all significant and were attributed to the increasing complexity of the responses. The purpose of this study was to extend the research of Henry & Rogers by determining the exact locus of SRT increase to the highly complex C response (three connected movement parts) as compared to the moderately complex B response (one movement part). The C response was divided into its three component movement parts and labeled C1 (first component), C2 (first plus second components), and C3 (the entire three-component C response). Using an apparatus that was a replica of the one used by Henry & Rogers (1960), eleven male subjects performed 40 trials of each of the four responses: B,C1, C2, and C3. Analysis of the data revealed that reaction time to the C1 response was about 5.4% slower than to the B response, but movement time was almost 70% faster to C1 than to B. This finding was attributed to the different muscle groups used and the resultant force-velocity produced for the B and C1 responses. It demonstrated that movement responses which are equivalent in terms of complexity (as defined by Henry & Rogers) can exhibit significantly different reaction times, which is contrary to what memory drum theory would predict. Further analysis revealed that all four responses were significantly different from each other in both reaction time and movement time ($\underline{p} < .05$). Reaction time was fastest to the B response, followed by C1, C2, and C3. Movement time, however, was fastest for the C1 response, followed by B, C2, and C3. It was also noted that the second component part of the C2 and C3 responses was executed significantly slower in C3 than in C2 ($\underline{p} < .05$). This finding was attributed to different accuracy and change-of-direction requirements in the C2 and C3 responses.

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April 15, 1980
10:15 a.m.

PLASMA HDL-CHOLESTEROL AND BODY COMPOSITION OF SWIMMERS AGED 8-16 YEARS.

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Eight-three competitive swimmers and twelve controls between the ages of 8-16 years were assessed for high density lipoprotein-cholesterol (HDL-C) and body composition (% fat). The purpose of this study was to determine the effects of regular exercise on HDL-C and %fat during the pre-adolescent and adolescent years. The HDL-C patterns at various age levels were also investigated. The results indicated that the swimmers had significantly higher levels ($p < .01$) of HDL-C than the controls. There was an inverse relationship ($r = .49$) between HDL-C and %fat in the swimming group. Further analysis found that even though weekly distances were similar (18-24 miles) the female swimmers had significantly greater HDL-C levels than the males ($p < .05$). The most striking HDL-C difference was found in the females aged 12-16 years. This group had significantly greater levels ($p < .01$) of HDL-C than females aged 8-11 years. The results suggest that regular, vigorous exercise elicits favorable HDL-C changes, as has been found to occur in adults. Also, as has been suggested in several adult studies, HDL-C and %fat are inversely related. Finally, the significant elevation of HDL-C in females after 12 years of age might be due to various physiological changes occurring as a result of puberty rather than exercise.

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April 15, 1981
8:30-10:00 a.m.

Poster #1

EFFECTS OF PANGAMIC ACID INGESTION ON PERFORMANCE PARAMETERS OF TRAINED ATHLETES.

Larry W. Titlow and Michael E. Gray, Northern Kentucky University, Highland Heights, Kentucky.

The effects of pangamic acid (Calcium Gluconate and N, N-Dimethylglycine) ingestion was examined during maximal exercise on trained athletes. Sixteen male track athletes ranging in age from 18 to 22 years participated in a three week study. The athletes were matched according to events and best mile times. Matched pairs were randomly assigned into either an experimental (E) or a control (C) group. The experimental group ingested six 50 mg. tablets of pangamic acid/day for 3 weeks. The control group ingested six placebo tablets/day for the same period. The study was conducted as a double blind. Prior to the experimental period all subjects were pre-tested using a Bruce protocol maximal treadmill stress test. The following performance parameters were observed: maximal heart rate (HR), maximal CO_2, maximal treadmill time, maximal minute volume, CO_2 at termination, 1 min. recovery HR, and 3 min. recovery HR. After the experimental period the Bruce test was readministered and the same parameters observed again. Maximal HRs were 183 bpm (E) and 194 bpm (C) pre-test and 181 bpm (E) and 194 bpm (C) post-test. Maximal treadmill time was 16.99 min. (E) and 17.99 min. (C) pre-test and 17.21 min. (E) and 16.83 min. (C) post-test. All performance parameters were analyzed using multivariate analysis of variance (MANOVA) to test for overall treatment effects. The MANOVA yielded an F=1.95, df=7,8, and p=.1844. The high p of F indicated no significant overall treatment effects; therefore, further examination of the data was not warranted. Within the limitations of the study, it was concluded that ingestion of pangamic acid does not result in any performance advantage during short term maximal exercise.

This study was supported by a grant from DaVinci Laboratories, South Burlington, Vermont.

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April 15, 1981
8:30-10:00 a.m.

Poster #2

EFFECTS OF GLUCOSE AND FRUCTOSE PREFEEDING ON PROLONGED EXERCISE.

R.G. McMurray, University of North Carolina; J.R. Wilson, University of North Carolina; B. Kitchell, Duke University; P.S. Robinson, University of North Carolina.

Investigations have suggested that prefeeding glucose before exercise increases plasma glucose, followed by increases in insulin release, which elicits a hypoglycemic response during the exercise. Prefeeding fructose, because of its insulin independence and slower absorption, may be beneficial in maintaining blood sugar and reducing insulin rebound, thus delaying fatigue. To investigate this hypothesis six trained females ran for 85 min at 80% V_{O_2}max, 45 min after the injestion of 100 gms glucose in 300 ml water (GLU), 100 gms fructose in 300 ml water (FRU), and 300 ml water (control). Heart rate, oxygen uptake, and R values were measured at 5 minute intervals. Blood samples, obtained at 0, 15, 30, 45, and 85 min of exercise, were analyzed for lactate, glucose and free fatty acids (FFA). Heart rates were similar for all trials ($\bar{x} = 173 \pm 8$ beats/min). Although V_{O_2} increased throughout the duration of all exercise, it was significantly lower during the GLU trials compared to the FRU or controls (GLU = 2.86 ± 0.07; FRU = 3.23 ± 0.14; control = 3.16 ± 0.10 L/min). R values were significantly higher during the GLU trials ($\bar{x} = 0.98 \pm 0.03$) than either the FRU ($\bar{x} = 0.93 \pm 0.02$) or control ($\bar{x} = 0.87 \pm 0.04$) trials. Blood lactate and glucose concentration continuously rose throughout the duration of the control runs. Blood lactate was not significantly altered throughout the GLU or FRU trials. Glucose injestion resulted in a significant reduction in blood glucose 15 min into exercise, returning to resting levels by the termination of exercise. FFA concentrations were significantly reduced when the GLU or FRU trials were compared to controls. FFA concentration was also reduced at the 15 min sample, comparing the GLU to FRU trials. It was concluded that although fructose maintained more constant blood glucose, fructose did not significantly affect performance. Prefeeding glucose, in spite of transient hypoglycemia, reduced the exercise V_{O_2} as a result of increased glucose utilization with a concomitant reduction in FFA.

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April 15, 1981
8:30-10:00

Poster #3

A COMPARISON OF PLASMA CHOLESTEROL, TRIGLYCERIDES AND HIGH DENSITY LIPOPROTEIN-CHOLESTEROL IN SPEED SKATERS, WEIGHT LIFTERS AND NON-ATHLETES.

P.A. Farrell; M.G. Maksud; C. Foster; M.L. Pollock; J.D. Anholm; J. Hare, University of Wisconsin - MIlwaukee and Mount Sinai Medical Center, Milwaukee.

Many reports provide evidence that endurance training elevates the concentration of high density lipoprotein-cholesterol (HDL-C) in the plasma. Several reports suggest that elevated HDL-C is associated with a reduced risk of coronary disease. The few studies which have used sprint or anaerobically trained subjects are equivocal in terms of the effect of intensity of training on HDL-C. The purpose of this study was to compare three all male groups who represent: purely anaerobically trained individuals (weight lifters, N=11, G-I), athletes who train both aerobically and anaerobically (speed skaters, N=11, G-II), and non-athletes (N=11, G-III) in terms of a selected lipid profile, relative fat, and maximal oxygen consumption ($\dot{V}O_2$ max). Total cholesterol (TC), triglycerides (TG) and HDL-C were determined from venous blood after a minimum 12 hour fast. The laboratory which performed the analysis is certified as a Lipids Research Center. G-II (6.3% fat) was significantly ($p < .05$ for all comparisons) less fat than G-I (11.9% fat) and Group III (20.5% fat). G-I had significantly less fat than G-III. G-II (62.3 ml/kg·min) had a significantly higher $\dot{V}O_2$ max than either G-I (45.7) or G-III (47.7). Neither TC nor TG were significantly different among the groups (G-I, TC=186.5 and TG=76.0 mg/dl; G-II, TC=166.9 and TG=76.0 mg/dl; G-III, TC=168.8 and TG=83.5 mg/dl). HDL-C for G-II (53.7 mg/dl) was significantly higher than G-I (46.1 mg/dl) and G-III (47.1 mg/dl) which did not differ significantly. Smoking habits and dietary history were similar for each group. When the HDL-C values from this study were compared to 14 separate studies from the literature, it was found that the values for G-II were intermediate between values reported for sedentary males and well-trained endurance athletes, the latter group showing values consistently in the 50-70 mg/dl range. These comparisons suggest that HDL-C elevation due to training may be specific to the intensity of that training. The question of whether endurance training has a more beneficial effect on HDL-C than does training which is primarily anaerobic in nature needs further inquiry.

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April 15, 1981
8:30-10:00 a.m.

Poster #4

THE INTERACTION OF EXERCISE AND AGING UPON SKELETAL MUSCLE MITOCONDRIA.

Roger Farrar; Thomas Martin; C. Murrary Ardies; and Hugh Bonner, The University of Texas at Austin.

This study was conducted to look at the interaction of exercise and aging upon skeletal muscle mitochondria derived from 2 regions of the cell, subsarcolemmal and intermyofibrillar. Rats were divided into 50 groups, 150-day control, 300-day control, 300-day trained, 720-day control, and 720-day trained. The trained animals initiated their endurance running protocol at either 120 days or 540 days. They ran 5 days a week, up to an hour a day. at a speed of 25-30 m/min. Following 48 hours of rest rats were sacrificed and the skeletal muscle excised and mitochondria isolated from 2 regions of the muscle cell, according to the procedures of Krieger, *et al*. (*J*. *Appl*. *Phys*. 1980, *48*, 23) The 720-day control animals showed significant decreases ($p < .01$) in the intermyofibrillar mitochondria compared to the 150-and 300-day control animals, but no decreases in oxidative phosphorylation per mg. of mitochondrial protein. The trained animals at both 300 days and 720 days showed significant increases ($p < .01$) in both subsarcolemmal and intermyofibrillar mitochondrial protein as well as significant increases in oxidative capacity per mg. of protein for both mitochondrial populations. The 720-day trained animals increased their oxidative capacity to the same level as the 300-day trained animals. The 720-day old animals did show a significant decrease in muscle weight from both 150- and 300-day control animals, whether they were trained or sedentary. In conclusion, aged animals showed the same ability to adapt to the aerobic stress of running as the younger animals. Aged control animals decreased in oxidative capacity per gram of skeletal muscle, but not per mg. of mitochondrial protein. This decrease was due to the decrease in the mitochondria in the intermyofibrillar region.

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8:30-10:00 a.m.

Poster #5

AN EXAMINATION OF THE PEAK PHYSIOLOGICAL RESPONSE OF YOUNG FEMALES TO THE BRUCE TREADMILL PROTOCOL.

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As young women are gaining employment opportunities in areas that require physical fitness capabilities such as law enforcement and fire fighting, there evolves a need for knowledge concerning the physiological response of young females to selected physical fitness evaluation protocol. Limited information exists in the published literature addressing the physiological response of young females to the Bruce Treadmill Test. Therefore, this study was conducted to examine the physiological response of 202 young females to this test. The sample represented a cross-section of occupational activities including professional women, sedentary housewives, nurses, college students and varsity athletes. The mean (±SD) age, height and weight were: 23.4 ± 4.7 years, 164.6 ± 6.3cm, 58.2 ± 8.2kg, respectively. Subsequent to receiving medical clearance, the subjects were familiarized with the laboratory personnel, equipment and procedures. During the data collection, the heart rate, ECG waveform modifications, ventilation volumes, blood pressure and expired air samples were obtained during a treadmill walk-run to volitional exhaustion. Inspired air volumes were determined using the Parkinson-Cowan CD-4 Gas Meter. Expired air samples were collected in meterological bags and were analyzed for oxygen and carbon dioxide contents utilizing the Beckman OM-11 Oxygen Analyzer and LB-2 Carbon Dioxide Analyzer, respectively. Recordings of heart rate and 12-lead ECG waveform modifications were obtained from the International Medical Corporation Viagraph. The aerobic capacity demonstrated at the point of volitional exhaustion is depicted by the mean (±SD) values for the following cardiorespiratory parameters: peak $\dot{V}_{O_2}$ 2.08 ± 0.41 l·min (STPD) and 35.8 ± 6.0ml·kg^{-1}·min^{-1} (STPD), $\dot{V}_{CO_2}$ 2.3 ± 0.5 l·min (STPD) and 39.6 ± 6.8ml·kg·min^{-1} (STPD), $\dot{V}_E$ 86.8 ± 19.5 l·min (BTPS), heart rate 187 ± 9 beats·min^{-1}, systolic blood pressure 166 ± 21mmHg, diastolic blood pressure 85 ± 11mmHg, double product (SBPxHRx10^{-2}) 308 ± 44 and time on test 9.1 ± 1.2 min. The mean peak $\dot{V}_{O_2}$ of this study is similar to that of non-athlete female subjects reported by Katch (Katch, F.I., et.al., Research Quarterly, 44:301-312, 1973) using the Balke-Ware treadmill test procedure. These data indicated that the Bruce Test Protocol is an acceptable procedure for examination of peak aerobic capacity of able-bodied females.

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April 15, 1981
8:30-1-:00 a.m.

Poster #6

THE INFLUENCE OF SELECTED MORPHOLOGICAL AND PHYSIOLOGICAL FACTORS AS DETERMINANTS OF WORKING CAPACITY IN THE ARMS AND LEGS.

B.C. McKeown, South Dakota State University; and R.A. Boileau, University of Illinois at Urbana-Champaign.

While the determinants of physical working capacity (PWC) of the legs have received attention in the research literature, very little information is available to characterize the primary influences of working capacity in the arms. In this study, the relative influences of selected structural and functional indices on the working capacity of the arms and legs were investigated and compared. Forty-six male volunteers (ages 18-25) were measured for body size, arm and leg circumferences and length, arm and leg circulorespiratory parameters and physical work capacity. Several measures of arm and leg PWC were made as follows on a cycle ergometer: (1) continuous, load-incremented PWC, and (2) constant load PWC. Significant differences ($p < .01$) between the arms and legs were found to exist for segmental volume (6.597 and 18,179 ml, respectively), $\dot{V}O_2$ max (2.56 and 3.72 l/min, respectively), and PWC (3,951 and 11,223 Kpm for the incremented load test; 9,328 and 16,053 Kpm for the constant load test). However, the differences in $\dot{V}O_2$ max and PWC were reduced when these measures were expressed relative to limb volume. In fact, the arm $\dot{V}O_2$ max was significantly greater than leg values when expressed relative to lean limb volume (448 and 241 ml/min · 1 FFV). Arm PWC per fat-free limb volume (FFV) during the constant load test was also significantly greater than leg PWC (1.54 and 1.00Kpm/ml · FFV, respectively) with approximately equal values during the incremented load test (.68 and .72 Kpm/ml · FFV). Multiple regression equations to estimate PWC on each of the incremented and constant load arm and legs tests produced multiple R's ranging from .59 to .92, accounting for from 34.3 to 83.8% of the variance in working capacity. The addition of limb volume to structure accounted for little variation in either arm or leg incremented or constant load PWC. $\dot{V}O_2$ max (l/min) contributed significantly to structure when estimating leg PWC (34.2 to 83.8% of the accountable variance in the incremented load test: 36.0 to 74.4% of the accountable variance in the constant load test). However, when leg PWC was estimated with $\dot{V}O_2$ max (ml/min · 1 FFV), leg volume was the greatest contributor. For both the incremented and constant load arm PWC, $\dot{V}O_2$ max (l/min) and deltoid tuberosity circumference was the greatest contributor to arm PWC with the $\dot{V}O_2$ max (ml/min · L FFV) expression.

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April 15, 1981
8:30-10:00 a.m.

Poster #7

SOMATOTYPES OF HIGH SCHOOL FEMALE CROSS COUNTRY RUNNERS.

Nancy Kay Butts and Barbara A. Thogersen, University of Wisconsin - La Crosse.

Height, weight, body density, percent body fat, lean body weight, selected skinfolds, girths and somatotypes were determined on 72 high school female cross country runners during the summer of 1980. The procedures and locations recommended by Behenke and Wilmore (1974) were followed for all anthropometric measurements except those variations necessary for the Heath-Carter (1972) somatotype procedures. A Harpenden skinfold calipher was used for the skinfold measures and all anthropometric measurements were taken by the same investigator. Residual volumes were obtained by the oxygen dilution technique in a seated position outside the hydrostatic weighing tank. The underwater weighing procedure was performed by each subject between six and ten times until three similar readings were obtained. Percent body fat was calculated according to the formulae of Brozek et al. (1963). The mean age, height and weight of the subjects were: 15.6 yrs, 164.4 cms and 51.1 kgs, respectively. As expected the mean body fat of 15.3 ± 3.4% was lower than the values typically reported for the non-athlete in this age group. This low percent body fat was reflected in the relatively low endomorphic component of the group. These young runners may be classified as "balanced ectomorphs" since their mean somatotype components were: endomorphic - 2.8 ± 0.95; mesomorphic - 3.2 ± 0.50; and, ectomorphic - 4.0 ± 1.04.

This study was supported in part by institutional research funds granted through the Faculty Research Committee, University of Wisconsin - La Crosse.

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April 15, 1981
8:30-10:00 a.m.
Poster #8

THE EFFECT OF ANTAGONISTIC CONTRACTION ON ELBOW FLEXION REACTION AND MOVEMENT TIME COMPONENTS IN MAN.

William S. Barnes, University of Northern Colorado.

A horizontal elbow flexion arm movement, executed at maximal speed, and timed from 130° to 100° flexion, was studied in 7 male subjects to determine the effects of a pre-stimulus antagonistic isometric contraction on fractionated reaction time and movement time. Subjects reacted to an auditory stimulus, immediately preceeded by one of three conditions. One condition involved complete muscular relaxation of both agonist and antagonist arm muscles prior to the response cue and constitutes an experimental control. The remaining two experimental conditions involved pre-stimulus isometric antagonist contractions at two different intensities. All subjects performed 20 trials at each pre-stimulus tension level (0,5,10kg), with tension treatments presented in a random order across subjects. Total reaction time was the time from stimulus to the change in arm position, and this was divided into premotor RT(stimulus to change in EMG) and motor RT(change in EMG to change in arm position). Movement time (30° displacement) and average angular velocity were also determined. All reliability coefficients were found to be high, i.e., in excess of R=0.87. A variance analysis, corrected for repeated measures, revealed that movement times and average angular velocities were significantly improved in conditions where pre-stimulus antagonistic contractions were performed. Movement times decreased 11.71% and 16.60% and average angular velocities increased 13.23 % and 19.75% in trials where pre-stimulus isometric antagonist contractions were performed at intensities of 5 and 10kg, respectively. Total reaction time, and its two components, premotor and motor reaction times, failed to demonstrate any significant change from the control condition. It is hypothesized that the improved times and angular velocities reported in this investigation might be due to reflex neuromuscular facilitation based on Sherrington's law of successive induction.

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April 15, 1981
8:30-10:00 a.m.
Poster #9

EFFECT OF TRAINING AND EXPERIENCE ON RELIABILITY OF SKINFOLD MEASURES. M.H. Slaughter; T.G. Lohman; and R.A. Boileau, University of Illinois, Champaign-Urbana.

The purpose of this study is to evaluate the effect of training and experience on the reliability of skinfold measures using three different skinfold calipers, namely, the Adipometer, Lange, and Fat-o-meter. For the first week test session, seven investigators (four inexperienced) read written descriptions as well as examined photographs of two skinfold sites (triceps and sub-scapula). Between the first and second week two of the inexperienced investigators were instructed by demonstration in the taking of the measures. The study was then repeated a week later. Twenty boys, ages 9 to 10 years, were used as subjects. Prior to training, differences between one experienced investigator using the Lange skinfold caliper and the four inexperienced investigators ranged from .1 mm to 4.4 mm for the triceps site. Mean differences were somewhat larger for the Fat-o-meter and Lange skinfold caliper than for the Adipometer. Correlations between one experienced investigator and each of the inexperienced investigators ranged from .95 to .98 for the Adipometer; .94 to .97 for the Lange, and .89 to .94 for the Fat-o-meter. Among the three experienced investigators mean differences were found for the Fat-o-meter. Similar results were found for subscapular site. After training two of the four inexperienced investigators, little change in mean values or correlations with one experienced investigator was found. The results of this study indicate that inexperienced investigators can follow written instructions with considerable success in obtaining reliable skinfold readings. A training session did not result in much improvement. Consistent differences among the three instruments and among investigators were found in both weeks of the study and present a difficulty in interpretation of skinfolds based on national norms.

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April 15, 1981
8:30-10:00 a.m.
Poster #10

PREDICTION OF $\dot{V}O_2$ MAX. IN MALES, AGE 10-39, Richard Washburn, Henry J. Montoye, University of Wisconsin-Madison.

To eliminate the discomfort, motivation and the hazards associated with maximal effort, a method of estimating $\dot{V}O_2$ max. from a submaximal test is needed. $\dot{V}O_2$ max. was measured in 474 males age 10-39, classified into 5 year age groups. Subjects walked at 3 mph 0% grade for 3 min, thereafter the grade was increased 3% each 3 minutes with speed constant until reaching the volitional level of exhaustion. For each subject regression equations were constructed from submaximal heart rate (HR) and $\dot{V}O_2$ using 5, 4, 3, or 2 data points. $\dot{V}O_2$ max was estimated for each subject using these 4 regression equations by extrapolation to an estimated maximum HR. In addition, $\dot{V}O_2$ max was predicted from submaximal HR and measured $\dot{V}O_2$ using the Åstrand-Rhyming nomogram (JAP, 7, 1954), the method described by Maritz et al., (ERGONOMICS, 4, 1961), and the procedure of Margaria (JAP, 20, 1965). Except for one age group the mean difference in $\dot{V}O_2$ max. (predicted-measured) was small (-.04 l/min to +.01 l/min). The exception was age group 10-14 in which $\dot{V}O_2$ was overestimated by 0.15 l/min. However the S.D. of the difference was large in each age group (.26 l/min to .46 l/min). Correlation coefficients (r's) for measured vs predicted ranged from .60 to .85 among the age groups. Almost identical results were obtained regardless of whether 5, 4, 3, or 2 data points were used. The mean difference in $\dot{V}O_2$ max. (predicted-measured) using the 3 popular methods was fairly small across all age groups (.04 to .21 l/min). Again the S.D. of these differences are large, ranging from .28 to .53 l/min. indicating poor individual predictions. $\dot{V}O_2$ max. tends to be overpredicted in age group 15-39 by the method of Åstrand Rhyming and underpredicted by the methods of Maritz and Margaria. All methods overpredict for age 10-14. In each age group the method of Maritz consistently provides the smallest S.D. although these are still quite large, ranging from .28 to .39 l/m. Correlation coefficient between measured VO_2 max and $\dot{V}O_2$ max. predicted by these three methods range from .54 to .84 with the method of Martz consistently providing the highest values. It was concluded that in an unselected male population the prediction of VO_2 max from submaximal measures of HR and $\dot{V}O_2$ by the methods described provide a reasonably accurate estimate of the mean $\dot{V}O_2$ max. for a group, however estimates for any one individual are subject to large errors.

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April 15, 1981

8:30-10:00 a.m.
Poster #11

EXERCISE AND AGING AS FACTORS IN REACTION TIME ACQUISITION.

Waneen Wyrick Spirduso, and Roger Preston Farrar, The University of Texas at Austin.

The purpose of this experiment was to study the effect of exercise and aging on acquisition of a motor task in an animal model in which the exercise factor may be much more controlled and rigorous, and the motor task much more highly practiced and motivated, than in an experiment using human subjects.

Young (120 day) and Old (500 day) Sprague Dawley rats were divided into four groups: Young exercisers, young controls, old exercisers, and old controls. Prior to the exercise treatments, all animals were shaped in 50 trials per day for seven days on an escape and avoidance reaction time type task that produced very rapid responses ranging from 100 to 200 msec. in the shortest conditioned stimulus-unconditioned stimulus (CS-UCS) intervals. CS-UCS intervals were 1000, 500, 300, and 200 msec. Both the young and old exercise groups then aerobically trained for six months by running daily on a rodent treadmill up to one hour. Aerobic training effects, measured by oxygen consumption per mg. of mitochondrial protein per gram of gastrocnemius-plantaris muscle tissue revealed that the exercise groups were well trained, expressed by a 71% and 97% increase in oxygen utilization by the young and old groups respectively.

Prior to the exercise program age differences ($F=8.54$, $p < .01$), days of acquisition ($F=59.65$, $p = < .01$), and CS-UCS intervals ($F=71.9$, $p = < .01$) were significant. The three way interaction was also significant ($F=2.48$, $p= .02$) indicating that the younger animals acquired the task faster and performed better in the shorter intervals than did the old animals.

Following the exercise program, the age, days, and intervals main effects and interactions were still significant. The exercised rats of both ages, however, reacquired the fastest CS-UCS task significantly faster ($F_{6,192} = 2.27$, $p=.04$) and to a higher level of performance than the nonexercised rats. This parallels other work of Spirduso and Farrar (submitted) which showed that old exercised animals, when they are well practiced and operating at their capacity, were superior to old sedentary animals at reaction time tasks.

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April 15, 1981
10:30 a.m.-12:00 noon
Poster #1

INTERFERENCE EFFECTS IN SHORT-TERM MOTOR MEMORY.

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The purpose of the present experiment was to examine the effects of interfering movements on the recall of movement distance and position information. Both proactive and retroactive interference effects were studied in a response biasing paradigm in order to examine two questions of importance in short-term motor memory research. The first was whether release from directional biasing could be accomplished by utilizing interfering and criterion movements with different encoding characteristics, and second, whether biasing results occur at a peripheral or central level. The encoding characteristics were varied by using preselected or constrained movements for the initial and interpolated movements and subjects were either pre or post-cued as to which of the two movements were to be recalled. Subjects completed 60 trials. The first 12 trials served as a control with subjects preselecting a movement distance and then recalling that movement after a 20 sec retention interval. In each of the remaining trials the preselected response was followed by a constrained movement which was either 10 cm to the left (-bias) or right (+bias) of the preselected position. The results indicated that directional biasing effects are not released even though the criterion and interpolated movements differed in their basic encoding attributes. The data from the retroactive interference paradigm indicated a strong biasing effect even when subjects were pre-cued and rehearsable movement cues were available. These results strongly support the contention that response biasing effects occur at a peripheral level. The proactive interference results indicated that the preselected response interfered with the retention of the criterion response even when subjects were pre-cued as to which response was to be recalled. This suggests that proactive interference may take place under forgetting instructions if the interfering response must be attended to.

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April 15, 1981

10:30 a.m.-12:00 noon
Poster #2

PREDICTION OF UNIVERSITY FEMALE BASKETBALL PERFORMANCE BY MEANS OF PRE-GAME STATE ANXIETY LEVELS.

Robert J. Sonstroem, University of Rhode Island; Pasquale Bernardo, University of Maryland.

The validity of the Yerkes-Dodson hypothesis was tested in predicting inter-game individual performance variation by means of state anxiety levels. Competitive trait anxiety (A-trait) measured by the Sport Competition Anxiety Test represented the second performance predictor. State anxiety (A-state) scores were obtained 20-30 minutes pre-game from university women's basketball team members participating in the season's opening competition, a double elimination tournament. Sample N was 30 (5 starters X 6 teams playing 3 games before elimination). Dependent variables were total points (TP) and a composite performance score (PERF) for each game. Study variable means were not significantly different across games. Subjects were trichotomously grouped on A-trait scores and a 3 X 3 anova (categories HI, MOD, LO) was employed with repeated measures on A-state categories. The A-trait effect was not significant for either TP or PERF ($F = 2.75$, $F = 2.91$ respectively). A non-significant trend in both cases revealed poorest performances in the HI-trait and best performances in the MOD-trait categories. Significant A-state effects were obtained in both analyses: TP, $F = 5.47$, $p < .01$; PERF, $F = 5.16$, $p < .01$. Both linear ($F = 5.97$, $p < .01$) and quadratic ($F = 4.97$, $p < .05$) components contributed to this effect in the case of TP. In the PERF analysis only a significant quadratic component was observed ($F = 7.35$, $p < .01$). A-trait, A-state interactions were not significant. A more exact data fit was utilized by developing standard scores for individual subjects across the three games and regressing TP and PERF separately on A-state values. The relationship of variables was found to consist essentially of a quadratic function ($F = 12.09$, $p < .01$ for TP; $F = 15.06$, $p < .001$ for PERF) which explained 16.9% and 18.4% respectively of within-subject variance. Signs of coefficients supported the Yerkes-Dodson hypothesis. It is concluded that moderate levels of state anxiety are most effective in promoting superior basketball performance of university women varsity players. Within the study high A-state scores were associated with poorest performances, significantly so in the case of TP. Plotting performance standard scores across A-state levels indicate this effect was pronounced in high trait anxiety players.

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April 15, 1980

10:30 a.m.-12:00 noon
Poster #3

FACTORS RELATED TO THE PREDICTABILITY OF COMPETITIVE STATE ANXIETY.

Thomas M. Wandzilak, University of Nebraska-Lincoln; Glenn Potter, University of Nebraska-Lincoln; Deana Lorentzen, University of Nebraska-Lincoln.

The primary purpose of this investigation was to assess the effectiveness of the Sports Competition Anxiety Test (SCAT), two different pre-competitive anxiety measures, and two parameters of success/failure to predict competitive state anxiety. Eight female varsity high school volleyball teams (N=93) were administered SCAT and the competitive short form of Spielberger's State Anxiety Inventory (SAI). SCAT was used to assess competitive trait anxiety while the SAI was utilized to determine pre-competitive state anxiety levels. The teams were divided into two groups with SCAT and the SAI being administered 24 hours prior to competition for group 1 and 3 hours before the first match for group 2. All subjects repeated the SAI 20 minutes before playing. Through a multiple regression technique, it was found that of the independent variables tested, SCAT (20%) and won/loss percentage (8%) resulted in a total of approximately 28% of the variance in predicting competitive state anxiety for group 1. For group 2, the 3 hour pre-competitive score (36%) and SCAT (13%) were responsible for 49% of the variance. The 3 hour leeway between test administration and the start of the competition which existed in group 2 allows sufficient time to predict competitive state anxiety and implement appropriate coping strategies. Although these results represent important findings in the area of competitive stress, more work is necessary in order to identify additional factors which contribute to the predictability of competitive state anxiety.

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April 15, 1981
10:30-12:00 noon

Poster #4

RELATIONSHIP BETWEEN THE LENGTH OF THE PSYCH-UP INTERVAL AND MOTOR PERFORMANCE: HOW LONG IS OPTIMAL?

Robert Weinberg and Allen Jackson, North Texas State University; Daniel Gould, Michigan State University.

The effects of psyching-up strategies on motor performance has recently received increased attention in the sport psychology literature. A variable which would seem to be important in understanding the effects of psyching-up on performance is the duration of the psych-up interval. Although, Genov (1970) has reported some case study data which suggest that weightlifters vary the length of their psych-up interval according to the difficulty of the lift, there is a dearth of experimental research investigating the relationship between the duration of the psych-up interval and subsequent performance. Therefore, it was the purpose of the present investigation to determine the effects that varying the duration of the psych-up interval has on performance. Forty male and 40 female subjects performed on a leg strength task and were randomly assigned to one of the following time conditions (1) 15 seconds (2) 30 seconds (3) self-initiated (subjects took as much time as they desired) (4) yoked (subjects were yoked to subjects in the self-initiated condition). Subjects performed four trials and the average of these trials was used as the major dependent variable. In addition, subjects were asked a series of questions assessing their cognitions after their performance. Since initial strength differences were displayed between the groups, or 2(sex) X 4(Psych-up Time) analysis of covariance was employed. Results indicated a significant sex main effect with males performing better than females. However, no significant differences were found between the four time conditions. Results from the post-experimental questionnaire indicated that males felt that their psych-up period made them more confident, allowing them to exert more effort and gave them a higher expectancy of success than females. In addition subjects reported using the following psych-up strategies; attentional focus, imagery, self-efficacy statements and preparatory arousal. Results are discussed in terms of possible variables mediating the psych-up performance relationship as well as Deaux's expectancy theory of sex differences. Finally, it is suggested that future research investigate the relationship between the length of the psych-up interval and specific psych-up techniques as well as the need for prior training in the use of these techniques.

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April 15, 1981
10:30 a.m.-12:00 noon

Poster #5

SITUATIONAL SPECIFICITY AND PERCEIVED COACHING EFFECTIVENESS IN HIGH SCHOOL FOOTBALL. Paul McMillan, University of Windsor, Windsor, Ontario, Canada.

Contemporary sport psychologists (Chelledurai 1978, Carron 1980) recently have begun to investigate the applicability of management theory to the sport environment. One of the trends of recent literature in sport leadership focused on by Hersey and Blanchard's Situational Leadership Theory posits appropriate behaviors for leaders to be determined by situational specificity. Hersey and Blanchard (1977) hold that as the subordinate's maturity increases, leader behavior should be characterized by a decreasing emphasis on task structuring behaviors and an increasing emphasis on relationship type behaviors. Therefore, when applied to the four quadrant leadership grid, a resultant curvilinear relationship represents the appropriate leader behavior to be exhibited. The purpose of this study was to determine if situational leadership theory could be upheld in the high school football setting. Incorporating a unique coach-ahtlete dyed design, respondents were tapped for task-relevant ability (maturity related dimension), perceived leadership style exhibited by the coach and perceived effectiveness of the coach. The data revealed that Situational Leadership Theory was not upheld in the high school football environment. Specifically, it was found that in the quadrants where the coach was classified as having an 'ideal' leadership style by the rating player, he was not percieved to be more effective than coaches with other leadership styles. Specifically, players regardless of "task-relevant ability" perceived their coach as more effective if he exhibited a HIGH RELATIONSHIP [High Task/High Relationship (S_2) or High Relationship/Low Task (S_3)] leadership style, rated them as significantly more effective than coaches with other leadership styles. In attempting to provide explanation for the results, the role that the coach plays in a team environment appears to be of extreme importance. Often the goals that the athlete is striving for are exemplified by the leader/coach which serves to enhance the "influence process." In addition, the stereotyping placed on the role of the coach may also contribute to the lack of support offered for Situational Leadership Theory in the high school football environment.

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10:30-12:00 noon

Poster #6

ATTIDUNAL EFFECTS OF PHYSICAL EXERTION. Robert W. Johnson and Constance D. Foster, University of Minnesota..

The purpose of this experiment was to examine the effects of prolonged physical exertion on subjects' attitudes toward the task. Female subjects (N=29) were asked to peddle a bicycle ergometer at 50 cycles per minute, for a period of twenty minutes at one of three alternate workloads; (1) 300 kpm · min^{-1}, (2) 600 kpm · min^{-1}, or (3) 900 kpm · min^{-1}. While peddling they were asked to respond (button press) as quickly as possible to a stimulus tone introduced at random intervals throughout the 20 minute period. Following completion of the cycling task a questionnaire, designed to assess the subject's attitude toward the task, was administered. The subject was also interviewed concerning her willingness to return to the laboratory for further testing and the workload desired in that testing session. Although the subjects were led to believe that the reaction time task was of paramount importance, the actual dependent measures were the attitudes expressed in the post experiment questionnaire and interview. MANOVA procedures were applied to these data and indicated significant differences in attitude across the treatment conditions. The application of univariate analyses indicated that subjects performing under heavy workloads perceived their performances to be poorer, felt more strongly that intermittant rest would have improved their performance, found the task to be more challenging, and expressed greater desire for lighter workloads in future sessions than subjects performing under light and/or moderate conditions. It was also observed that subjects performing under light workloads found the task less challenging and expressed a greater preference for heavier future workloads than subjects in the moderate or heavy workload conditions. Past research, utilizing performance outcome as the single dependent measure, suggests that practice may continue under fatiguing conditions unless there is risk of injury or the character of the responses performed is dramatically altered. The wholesale application of this principle becomes questionnable when one considers it in the context of attitude and the results of this experiment. These results suggest that the level of physical exertion experienced does influence subjects' attitudes toward the task. This fact has ramifications for both the practice of physical training and future research in motor behavior.

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April 15, 1981
10:30 a.m.-12:00 noon
Poster #7

THE RELATIONSHIP OF SWIMMING PERFORMANCE TO MEASURES OF ATTENTIONAL AND INTERPERSONAL STYLE.

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This study examined the relationship of attentional focus and interpersonal style with success in swimming and diving. Nideffer's Test of Attentional and Interpersonal Style (TAIS) was administered to collegiate women swimmers (n=120), divers (n=20) and non-athletes (n=26). Stepwise multiple discriminant analysis techniques supported the following hypotheses: (a) the TAIS can differentiate among collegiate women sprint swimmers, distance swimmers, divers and a control group of non-athletes, (b) the TAIS can predict performance levels of collegiate women sprint swimmers, distance swimmers and divers, and (c) a coach's subjective rating scale can predict performance levels of collegiate women sprint swimmers, distance swimmers and divers. The results supporting the first hypothesis showed that the largest separation of groups was between the athletes and the control subjects with factor loadings of physical orientation and extroversion on the only significant function. In regards to the second hypothesis, the factors separating the swimmers by performance levels were primarily the personality subscales, although reduced attention was significant concerning the sprint group. External overload was the lone item in the discriminant function separating high performance divers from low divers. The coach's rating scale consisted of four situational questions depicting performance as controlled by attentional focus. This rating scale had a substantial canonical correlation with swimming performance. Such a relationship indicates the importance of such situational defined attentional focus items in swimming performance, although they were not highly related to the TAIS. The lack of correlation of the coaches' ratings and TAIS attentional subscales suggest that they are measuring different aspects of the athletes' behavior. A combination of both psychological measurements and the coach's perception of each athlete's efforts may be suggested for developing additional theoretical and practical measures of attentional focus.

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April 15, 1981
10:30 a.m.-12:00 noon
Poster #8

SKILL, SEX, RACE AND ATTITUDE TOWARD PARTICIPATION IN PHYSICAL ACTIVITY. C. Eric Gronbech, Chicago State University and Roy Greensley, Eisenhower School.

The purpose of this study was to determine how physical performance, sex and race affected the attitude of intermediate school children toward physical activity. 73 S's of approximately equal sex and race (Black and White) were administered an adaptation of Kenyon's A.T.P.A. Scale. The present scale, included two additional reasons for participation in physical activity, for competition and for fun, as well as, a name recognition inventory. Results from the AAHPER Youth Fitness Test and the previous year's physical education grade served as criteria for classifying the subjects into 5 equal physical performance levels. Results of eight, 5 (physical performance level) X 2 (sex) by 2 (race) ANOVA's indicated no significant differences between excellent, good, average, fair or poor performers in reasons for participation in physical activity. Social aspects of participation were more attractive to females than males and to Blacks than Whites. Training was seen as more of an inducement for participation for males than females. Beauty aspects were more attractive to females than to males. Competition was favored by males to a greater degree than to females. White subjects favored the thrill aspects of activities more than Black subjects. No significant differences existed in the areas of participation in physical activity for health, fun or catharsis between male and female, Black or White subjects. The conclusions of the present study support our sexual stereotypes of females being more interested in the social and aesthetic aspects of sport participation, while their male counterparts are interested in the ascetic and competitive aspects. The interest shown by Blacks in the social aspects may be relative to their later participation in team rather than individual sports. White interest in the pursuit of vertigo may in part explain the predominance of Whites in activities such as automobile racing and skiing. The unexpected finding of no difference between groups of different skill levels is perplexing; manifestation of this finding may relate to such problems as the attraction of competition to both skilled and unskilled performers and its effect on learning and performance.

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April 15, 1981
10:30-12:00 noon

Poster #9

SELF-PERCEIVED SEX ROLE AND FEMALE INVOLVEMENT IN SPORT.

Elizabeth K. Clark, San Diego State University; R. Gary Ness, University of New Mexico; Therese E. Goetz, University of New Mexico.

Until recently, society's sex-typed standards of desirable behavior were very restrictive concerning female sport participation. Extensive involvement in sport was thought to threaten femininity both physically and mentally. Today many girls and women enjoy and sustain involvement in physical activity as well as vigorous competitive sports. Do females involved in competitive sport behaviors perceive themselves as less stereotypically feminine than their less-involved counterparts? The general problem of this study was to comparatively survey personal competitive sport profiles and self-perceived sex roles of selected female sport participants, 15 years of age or older, engaged in non-to-moderate competitive, intense competitive, or elite competitive situations in the sports of diving, golf, swimming, and volleyball. A 4(sport) x 3(level of competitiveness) x 4(age) factorial design was employed. The dependent variables were the masculine, feminine, and androgynous sex role orientations as measured by the Bem Inventory. Subjects were 657 females involved in one of the selected competitive sport behavior situations. Sex role orientation scores were figured using a multiplicative function of the Bem Inventory masculine and feminine scores. Multivariate analysis of variance revealed a composite score main effect for level of competitiveness as significant (α=.004). Subsequent univariate analysis revealed significant (α=.035) differences for masculine scores only. Although the masculine scores varied significantly across sports and levels of competitiveness, they were consistently lower than the feminine scores recorded. The androgynous scores of the female sport participants studied resulted from varying masculine but consistently higher feminine scores. Results from this study suggest that the females surveyed maintained a stronger feminine than masculine role perception of themselves regardless of their level of competitive involvement in sport.

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April 15, 1981

10:30 a.m.-12:00 noon
Poster #10

ATTENTIONAL NARROWING AND EXERCISE STRESS. Herschel Leibowitz, Daniel Landers, & David Furst. The Pennsylvania State University

Inappropriate attentional narrowing is considered to be one of the major attentional problems encountered when under stress. Research suggests that in a dual-task situation necessitating speed of response to central (foveal) and peripheral visual cues, with few exceptions a performance decrement is found on the peripheral task. Closer examination of the studies reveals that subject's attention has been unevenly distributed to a point in the visual field (usually the fovea). Whether narrowing can occur when the task is such that it forces subjects to spread attention evenly over small and large visual fields is a question that remains to be answered. Thus, the purpose of this study was to examine the effects of exercise stress on subjects' ability to react to stimuli located centrally and in the near and far periphery. Male subjects (N=20) were divided into two equal groups, exercise and no exercise. Subject's reaction times (RT) were measured for the large or small attentional field containing five equally probable stimulus lights, one central light and four peripheral lights set on the four cardinal points in the visual field. In the small field condition all lights were set in the center of the field (2.4^{o} visual angle), in the large-field condition the four peripheral lights were positioned at the edges of each subject's visual periphery ($>50^{o}$ visual angle). Subjects reacted to the offset of any of the lights by pressing a microswitch. Both groups reacted to the lights for two 20-minute sessions with the exercise group bicycling at 75% of their maximum heart rates. Random foreperiods and catch trials were used. A 2 x 2 x 5 (exercise by field size by light position) ANOVA showed that when monitoring the larger as opposed to the smaller visual field, subjects in both groups were slower by 119 msec to the center light. This result is interpreted as showing that the requirement to spread attention throughout a larger field not only results in slower reactions in the far periphery as has been found previously, but also detrimentally affects the RT to the central stimulus. Exercise stress did not significantly affect peripheral or central RT. The failure of these results to demonstrate narrowing is interpreted as evidence for the necessity of forcing subjects to subdivide the task into primary and secondary task components in order for narrowing to occur. It is suggested that past literature has confounded task priority and spacial positioning of the tasks, so that subject's strategy has been to maximize their performance on the primary task while sacrificing their performance on the secondary task.

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April 1[illegible], 1981
10:30 a.m.-12:00 noon

Poster #11

RELATIONSHIP OF FINAL PHASE STRIDE PATTERN TO DISTANCE JUMPED IN CHAMPIONSHIP LONG JUMPERS. Charles W. Armstrong, University of Toledo.

Considerable debate is evident in the track and field literature regarding variations in the final strides of the long jump approach. Some documentation exists supporting the contention that the final two strides differ in length from those that precede them. It has been suggested that, in general, the penultimate stride is lengthened slightly, while the take-off (last) stride is shortened. Various authors have indicated that such changes are necessary to facilitate muscle contraction through altering the muscle-joint relationships as well as activating various stretch reflexes, and to promote the optimum take-off angle. Others have proposed that stride length alterations are actually the product of changes made in trunk position which appear to be necessary for maximizing vertical take-off velocity. Regardless, there are changes in stride pattern that appear to follow consistent patterns. This study sought to examine these patterns in relation to distance jumped. Fifty jump sequences were examined from films taken during the long jump trials and finals at the 1979 NCAA Outdoor Championships. Data were reduced with the Talos digitizer to determine the length of each of the last two strides preceding take-off. This information was used to produce a value representing the last stride as a percentage of the penultimate stride. Analysis of the data indicated that those jumps associated with a percentage greater than one-hundred did not differ in length from those with a percentage less than one-hundred. The mean percentage (95.31) for competitors having the best average, over all trials, differed significantly (.01 level) from the mean percentage (90.41) of those having the poorest overall average. Variability in percentage over trials was found to be negatively correlated to distance jumped. The results indicate that outstanding jumps occur when the take-off stride is longer than the penultimate stride, as well as when it is shorter. Additionally, take-off stride as a percentage of penultimate stride varies as a function of performance level, and the consistency of this percentage across trials improves as performance level increases.

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April 15, 1981
10:45 a.m.

CINEMATOGRAPHIC ANALYSIS OF THE CENTER QUICK HIT IN VOLLEYBALL AS PERFORMED BY THE WOMEN'S NATIONAL TEAM.Allen E. Brue; Robert Shapiro, Northern Illinois University.

The mechanical analysis of competitive volleyball skills is limited to a small number of studies. The majority of the work done has included male subjects only. Recently, Shapiro and Brue (1979) reported the kinematics of spiking from research done on the USA Men's National Team. The authors reported both quantitative and qualitative information about the center quick hit utilizing the male subjects. Both the Men's and Women's National Volleyball Teams utilize the center quick hit in their offensive strategy. However, they do not perform the skill in the same manner.

Very little literature has been found describing the mechanics of spiking in general and even less was found regarding women spikers. Therefore, the purpose of this study was to examine the kinematics of the center quick hit as performed by members of the Women's National Volleyball Team.

Members of the Women's National Volleyball Team were filmed at the Olympic Training Center in Colorado Springs. Position and time data for all spikers and setters were obtained by digitizing film on a Numonics Digitizer. A Computer analysis provided appropriate kinematic parameters.

Horizontal approach velocity for the women spikers were approximately 1.8 m/s. The mean horizontal velocity at takeoff was .5 m/s. Vertical takeoff velocity was approximately 2.1 m/s. The mean vertical displacement was 62.5 cm. The spiked ball velocity ranged from 12 m/s to 18 m/s. The angle the ball deviated from the horizontal was approximately -29 degrees. Takeoff of the spiker was observed after the ball was set in the majority of the subjects. The setters held the ball in their hands on the average of .127 seconds.

Based on the results of this study the following observations were made:

1. The kinematic patterns exhibited by the subjects were very similar.
2. The kinematics were similar to those reported by Shapiro and Brue but were proportionately smaller, i.e., velocities.
3. In successful hits the ball was released by the setter before the spiker left the ground in the jumping phase of the hit.

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April 15, 1981
11:00 a.m.

CINEMATOGRAPHICAL ANALYSIS OF JAVELIN THROWING TECHNIQUE OF DECATHLETES.

David A. Kaufmann, University of Florida; Hansruedi Kunz, Eidgenossische Technische Hochschule, Zuerich, Switzerland.

The purpose of this study was to analyze by correlational methods the biomechanical factors involved in achieving the maximal distance thrown in the javelin event. Twelve Swiss decathletes and two world class javelin specialists were filmed by a high speed (102 fps) 16mm camera throwing in the total 20 trials. The coordinates of the cyclograms were processed by a computer program with the results submitted to correlational analysis. The highest correlation was .76 (P 0.001) between velocity at release and distance thrown. Other significant negative correlations were found between distance thrown and angle of the javelin with the horizontal (-.52) and distance thrown and hand (r) - foot (l) distance during the last strides (-.67). Javelin specialists, who had longer throws than decathletes ($\bar{x}$ = 79.03m versus 54.29m), had a smaller difference between the angle of attack and angle of release. The results suggest that in order to attain maximal distance thrown the javelin thrower should achieve positive acceleration during the running approach, effective thrusting with the right leg on the penultimate stride and carry the javelin during the last strides at the optimal angle of release (32 to 36 degrees).

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April 15, 1981
11:15 a.m.

BIOMECHANICAL COMPARISON OF OVERHAND AND SIDEARM THROWING PATTERNS OF LACROSSE PLAYERS. Mary L. Dawson, Western Michigan University; and John R. Stevenson, Indiana University.

The purpose of this study was to compare and contrast two styles of throwing patterns as performed by varsity lacrosse players. These styles, an overhand and sidearm motion, were evaluated on the basis of several kinematic variables. Eleven lacrosse players from the varsity and junior varsity lacrosse teams of the The Johns Hopkins University served as subjects for this study. Subjects were filmed in two orthogonal planes to provide measurement in three dimensions. A Photosonic 1-PL camera, equiped with an Augenieux 10-120 lens, was placed perpendicular to the plane of motion. A Locam, model 164-5AC, also equiped with an Augenieux 10-120 lens, was placed parallel to the plane of motion. Both cameras operated at a rate of 150 FPS and were loaded with Kodak Ektachrom, Tungsten 7250. The subjects performed several trials of each style, from which the best trial was selected for analysis. Selected trials were digitized using a Neumonic 1224 electronic digitizer interfaced to Western Michigan University's Decsystem 10 computer. Data were submitted to a three-dimensional Fortran program written specifically for the study. Data from Dempster's study (1955) were used to define the location of the body's center of gravity during each throw. Selected variables were temporal data, angular data, velocity, acceleration patterns, hand position, and position at release. Results indicated that the two styles differed in angular acceleration of the hands and stick head velocity with the sidearm style providing greater velocity and acceleration of the ball at release. The sidearm style also resulted in a shorter distance between hand-stick position and a greater angle of body lean before release. It was concluded that the sidearm style of throwing provided greater velocity at release by providing a longer force arm than the overhand style of throwing.

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April 15, 1981
11:30 a.m.

AN EFFORT ANALYSIS OF STRIKING WITH DIFFERENT BODY PARTS AND OF THROWING. Dathryn L. Kisabeth, University of Maryland-College Park.

A detailed examination of a child's movement performance was completed using Labanotation. The movement performance of a ten-year-old boy was video-taped for ten minutes on six separate days. The subject was required to throw a ball or strike it with different body parts. The plastic ball was to be kept in the air continuously. A Certified Teacher of Labanotation was employed to notate the entire movement performance in detail. The notation included all aspects of body, space, time, and dynamics. The dynamics, specifically the effort action data are presented in this paper. An effort action is a specific combination of three motion factors: weight (exertion), space (path), and time (duration). Each motion factor has two extremes, weight (light to strong), space (flexible to direct), and time (slow to quick). The notator recorded the specific effort action that occurred for each strike and throw performed during the execution of the task. More than 92% of all effort actions related to striking as this was the predominant action in the child's performance. A total of 2705 effort actions were identified. It was found that seven of the eight possible effort actions were utilized on Days 2 and 3; six of these were seen on Day 4 and 5; and, five were notated on Days 1 and 6. The tabulated results for each effort action showed: an increased use of Dabs and Flicks (quick and light factors), and a decreased occurrence of Punches (quick and strong factors). On the sixth day there was a large increase in occurrence of the Flick (quick, light, flexible factors). These results were interpreted to indicate that the child became more skilled in the performance of the task as shown in his increased use of quick, light, and flexible motion factors. Employment of these factors allowed the child to maintain control of the object while continuously striking with different body parts. These results lend support to Rudolf Laban's hypothesis that skill is acquired through the gradual refinement of the feel of the movement which he described as the awakening of the sense for proportions of motion factors.

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April 15, 1981
11:45 a.m.

A KINEMATIC ANALYSIS OF THE BASEBALL BATTING SWINGS INVOLVED IN OPPOSITE-FIELD AND SAME-FIELD HITTING.

Eric Pfautsch, University of Illinois, Champaign-Urbana; Donald McIntyre, North Texas State University.

The purpose of this study was to examine the mechanics of hitting a baseball to the same and opposite fields, with special emphasis placed on an identification of those factors which distinguish players of different hitting abilities. Twenty male subjects were assigned to one of two groups according to their baseball hitting abilities. Each subject performed as many trials as were necessary to successfully hit a pitched ball three times to both the same and opposite fields. Each trial was filmed from above. No significant interactions ($p < 0.05$) were found between subject groups and field hits with selected temporal and kinematic parameters entered as dependent variables. The component linear displacement patterns were found to be similar in form for both field hits. Significant differences ($p < 0.05$) were found between body landmark and segment component displacements and velocities at the instant prior to ball contact. The maximum resultant linear and angular speed of the examined body and bat landmarks was found to occur prior to ball contact. The location of the bat at the instant prior to ball contact was found to be in front of the home plate for all conditions with the hands preceding the bat for the opposite field swing. The angles of incidence and reflection between the bat and the ball were found to be the same for all conditions. Based on the results of the study it was concluded that no interactions exist between hitting ability and baseball hitting technique and that differences in the mechanics of hitting to defined field areas are due to: 1) differences in the angular displacements of the left wrist and left elbow joints and 2) differences in the temporal characteristics of the swings.

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April 15, 1981

12:00 noon

A MULTI-PURPOSE COMPUTER PROGRAM FOR MODELLING HUMAN MOTION.

Nancy L. Pike, University of Houston.

The purpose of this article is to describe a multi-purpose computer program, that can be used to predict the motion of a mechanical system with n degrees of freedom. This program both formulates and solves the equations of motion of an open loop, spatial linkage system. The computer program's equations of motion were defined utilizing Lagrangian mechanics. This particular approach equates the differential changes in the total energy of the system to the forces causing that motion. The program's Lagrangian equations of motion were derived using a 4x4 matrix transformation technique. In this technique the three translational and three angular degrees of freedom accorded an extended body in space are represented by six different transformation matrices. Each transformation matrix defines a relative displacement between two coodinate systems. In formulating the Lagrangian equations of motion the 4x4 transformation matrices had to be differentiated. To do this differentiation, seven other 4x4 transformation matrices, known as differentiating operators, had to be defined. The input to the program can include the forces and/or torques which act on the system, as well as the motions (fixed degrees of freedom) of any segments within the system. The specifying of these motions will cause the computer program to automatically evaluate the magnitude of the forces and/or torques which produced the known motions. In addition the output of the computer program will predict the system's non-specified motions (free degrees of freedom).

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April 15, 1981
12:15 p.m.

THE EFFECTS OF GENERAL EXPECTANCY OF SUCCESS, SEX, AND SUCCESS OR FAILURE FEEDBACK ON CAUSAL ATTRIBUTION AFTER MOTOR PERFORMANCE.

David A. Ludwig, University of Cincinnati, Behavioral Sciences Laboratory; Dale G. Pease, Iowa State University.

The expectancy of success prior to performing a motor task and its effect on causal attribution during success or failure feedback, was investigated in 64 college aged males and females. A questionaire was used to obtain a general level of success expectancy (high or low) for each subject, prior to any knowledge of the tracking task which they were later asked to perform. Success expectancy level was based on the participant's own criterion of success and not predetermined standards. Upon completion of the tracking task, subjects were randomly assigned to either a success or failure feedback condition regardless of actual performance data. Subjects were led to believe that their success or failure was based on their performance as it compared to norms (factitious) established for their selected level of success. Subjects were then asked to attribute their success or failure in various degrees to ability, effort, luck, and task difficulty. The effects of feedback condition, success expectancy, and sex on the four attribution categories were analyzed by a 2 X 2 X 2 multivariate ANOVA. The MANOVA indicated an overall main effect for feedback condition and for the success expectancy by feedback condition interaction. An overall sex and sex by feedback condition interaction was also detected. Follow-up univariate analysis and plots of the least squares means indicated an ordinal interaction for the effort attribution. The degree to which high and low expectancy subjects attributed their success to effort was virtually identical. However, under a failure situation low expectancy subjects attributed effort to a significantly greater degree than high expectancy subjects. The sex by feedback condition interaction was found to be present in the ability attribute, with males attributing their success to a significantly greater degree of ability than females while the reverse was true under the failure situation. The results have implications to motivational factors which may influence subsequent motor skill development.

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April 15, 1981

1:30 p.m.

A COMPARISON OF PERSONAL ATTRIBUTES REGARDING MASCULINITY, FEMININITY, AND ANDROGENY BETWEEN FEMALE ATHLETES AND NON-ATHLETES.

Shirley A. Laney, Ph.D., Western Kentucky University; Sharon L. Shields, Ph.D., George Peabody College for Teachers of Vanderbilt University.

The psychological constructs of masculinity and femininity have, until very recently, been conceptualized as bipolar; that is, an individual could not be both highly masculine and highly feminine. In the past decade, Spence and Helmrich, and Bem, have challenged the concept of bipolarity and have presented a third construct, known as androgeny. The purpose of this investigation was to determine whether differences existed among eleven groups from the following sources: a) female athletes from a state supported university, b) female athletes from a private university, c) female athletes from city recreational sport leagues, and d) a group of female university students majoring in elementary education. The Personal Attributes Questionnaire was administered to 159 subjects. Of these 39 were members of varsity athletic teams at Western Kentucky University, 32 were members of varsity athletic teams at Vanderbilt University, 49 were members of teams participating in city recreation leagues, 39 were elementary education majors at Western Kentucky University, six of whom had prior athletic participation experience. The results of three ANOVAS were as follows: no differences existed among groups on the femininity scale, differences on the androgeny scale were significant beyond the .05 level of confidence, and differences on the masculinity scale were significant beyond the .01 level. Duncan's New Multiple Range test was used to determine specific differences on the latter two scales. The elementary education majors were significantly lower in androgeny than were the members of the black softball team and members of the white softball team. No other differences existed in androgeny. The elementary education majors were also significantly lower in masculinity than the black softball players, but no other differences were found in this dimension.

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April 15, 1981
1:45 p.m.

FEMALE SOCIALIZATION INTO SPORT: CHILDHOOD INFLUENCES.

Susan L. Greendorfer, University of Illinois.

Research on sport socialization assumes that the process begins in childhood, is continuous throughout the life-cycle, and incorporates principles from social learning, modeling, and role theory. Data suggest that the social role-social system model is a viable approach for males and that sport socialization is invariant across cultures. However, little attention has been given to female socialization into sport, and the literature contains several contradictory findings relative to significant predictors of female sport involvement. Whereas some have indicated that family and school are significant, others have found that peers and family are most influential -- with the school playing a minor role. Further, the process appears to be inconsistent for females, as social structure, racial, and geographical factors play a significant role. Therefore, the purpose of the study was to apply the social role-social system approach to females who were involved in sport as well as those not involved in sport, and, to determine in which dimensions, if any, the process differs across the two samples. A fixed-alternative questionnaire was administered to 110 female athletes and 244 female nonathletes (Test-retest reliability, r = .89). Stepwise regressions allowed for an in-depth analysis comparison of the process and revealed that: Childhood and adult sport involvement of athletes were functions of a different ordering of independent variables than was childhood and adult sport involvement of nonathletes. Primary consideration was given to the relative contribution and ordering of independent variables for both samples. Similarities and differences between the samples were discussed relative to the amount of variance accounted for in the model (17% and 43% for athletes and 20% and 43% for the nonathletes).

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April 15, 1981
2:00 p.m.

GEOGRAPHICAL VARIATIONS IN SPORT PARTICIPATION FOR HIGH SCHOOL BOYS AND GIRLS. **David Miller, The Pennsylvania State University; Lauren Doyle, The Pennsylvania State University.**

In 1973 girls' high school participation was estimated to be 15 percent the level of boys' (Rooney, 1974). It was hypothesized that this percentage would have risen since then due to the implementation of Title IX. Consequently, information was gathered from the National Federation of State High School Associations (NFSHSA) to investigate this question. Using figures from the U.S. Bureau of the Census and the U.S. Center for Education Statistics to establish an accurate estimate of the high school populations of each state by sex, NFSHSA figures were used to calculate the average ratio of athletes to total population by state for the 10 most popular national sports for both boys and girls. The ratios of girls' to boys' participation by state for all sports were calculated. For the five most popular sports having both boys' and girls' teams, ratios were calculated comparing participation of girls to boys. The fifty states and the District of Columbia were ranked according to percentage. On the basis of these findings several conclusions were drawn relating to the present status of participation and equality in high school sports. For example, from 1973 to 1979 there was a 353 percent increase in girls' level of participation relative to boys'. Yet, girls' participation is still only 53 percent that of boys'. It was found that states in the region west of the Mississippi and east of the Rockies, as well as New England, have a greater orientation toward equal participation in sports for boys and girls. Equality and strength of participation was found in many traditionally Republican states. It has been suggested that small towns rely on sport as an important social function (Rooney, 1974; Bussett in Rooney, 1974) and that support is greatest amongst the less educated, in small schools, in schools with a strict authority structure and amongst students at the center of the school's activities (Eitzen, 1973). These findings agree with such suggestions, however, further investigations into the role of average city sizes and high school sizes in each state should be undertaken. Studies using geographical analyses are well suited to investigating equality and participation in sport. Sports in which there are both male and female teams can be directly contrasted in order to investigate possible covert inequalities under Title IX. Women's participation, though low in general, is increasing and geographical investigations aid in the understanding of the American sport fabric.

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April 15, 1981
2:15 p.m.

EDUCATIONAL ATTAINMENT AND COLLEGIATE ATHLETES: INTRA-GROUP ANALYSIS AND COMPARISON TO THE GENERAL STUDENT POPULATION.

Dean A. Purdy, Bowling Green State University; Richard Hufnagel, Colorado State University; D. Stanley Eitzen, Colorado State University.

The topic of educational attainment of collegiate athletes has been bantered about recently. However, very little empirical research exists to substantiate any argument concerning the relationship of collegiate athletic participation and educational attainment. This study was undertaken at a major (NCAA Division 1-AA) western university to assess the extent of the athlete's educational progress at the institution. All athletes who participated in intercollegiate programs during the past 10 years, both males and females, were included in the sample (N=2088). The athletes' educational progress, measured by their grade-point-average and graduation rate, were compared to the general student population as well as to various subgroups within the athlete population. Athletes were found to be only slightly different than the general student population with regard to grade-point-average, graduation rate, entrance scores and high school grade-point-average. Results indicated that significant differences existed between certain groups within the athlete population. Educational achievement was more likely to be found in females than males, and in the Caucasian ethnic group rather than among Blacks. Individual and nonrevenue producing sport participants scored higher on the measures of educational achievement than did athletes from the major revenue producing sports. The data refute the notion that athletic participation is detrimental to the educational attainment process. However, particular subgroups of athletes may be placed at a disadvantage with respect to achieving the goal of a college degree, either through their previous socialization or the time demands made by particular sports.

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April 15. 1981
2:30 p.m.

DROP OUTS FROM SPORT: A CASE STUDY OF BOYS AGE GROUP SOCCER.

John C. Pooley, Dalhousie University, Nova Scotia.

The purpose of this study was to determine why boys withdrew (dropped out) of organized soccer leagues during or at the conclusion of the 1977 season. From a population of 103 drop-outs aged 10-15, (representing 22% of those who registered:475) 50 boys from seventeen different teams representing ten clubs were administered an interview schedule by the author and two assistants. One or both parents were also asked why they believed their sons dropped out; responses of boys and parents were compared. Results showed that 25% of the younger boys (aged 10, 11 and 12) and 38% of the older boys (aged 13, 14 and 15) dropped out because of the emphasis on competition; 54% of the younger boys and 37% of the older boys dropped out because of a conflict of interest; 12% of all boys dropped out because of poor communication; and 12% of the older boys dropped out for 'other' reasons but especially because of the unavailability of a team with whom to play. Supporting these results were data from questions about parental support and involvement; practices; reasons for becoming involved; coaching behaviors; and changes they would like to see in youth soccer. With few exceptions the opinions of parents and their offspring did not concur. Conclusions reached were that if fewer boys were to dropout of organized soccer programs, the following major changes seem necessary: there must be less emphasis on competition; practices and playing must be made more attractive; and communications between players and coaches and managers must be improved.

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April 15, 1981
2:45 p.m.

ATHLETIC HEROES AND HEROINES: THE ROLE OF THE PRESS IN THEIR CREATION

Judith A. Cramer, University of Hartford; Jon E. Walker, University of Hartford.

This paper is concerned with the role of the press in the development of the athletic hero/heroine. Following the work of Davidson (1976), two types of heroes/heroines are identified: short term ("sport hero") and long term ("hero in sport"). Both types involve performance and situation factors, but it is argued that the long term hero/heroine requires the additional characteristics of "pleasant" personal nature and physical attractiveness. The athlete-press relation is characterized as one of interdependence, but it is stressed that the press has a clear power advantage. Further, it is noted that the press (i.e., sports writers) play a critical role in shaping the image of the long term athletic hero/heroine. The press accomplishes this in a number of different ways. Sports writers emphasize (and de-emphasize) selected attributes and characteristics of athletes and thereby create an image which is "event making" and also fulfills their own needs for press. This image plays to both audience as consumer and the values and interests of the reporter. Acceptance of the image by the public rests to a great extent with the fact that most people take for granted the press's "construction of reality," especially in those areas which are ambiguous and uncertain. The data for this paper were obtained from in-depth interviews with sports writers in two different geographical settings. The interview schedule contained both open-ended and fixed response items. Special attention was paid to how sports writers select and define athletic heroes/heroines. This paper is an outgrowth of a larger project directed toward developing knowledge concerning the role of the press in shaping sporting activities in general and affecting athletes in particular.

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April 15, 1981
3:00 p.m.

RESIDUAL LUNG VOLUME MEASUREMENT IN THE CALCULATION OF PERCENT BODY FAT IN COLLEGE WOMEN.

D.A. Sedlock, P.I. Fitzgerald, H. Weber, and R.G. Knowlton. Southern Illinois University-Carbondale, Illinois and East Stroudsburg State College-East Stroudsburg, Pennsylvania.

Controversy exists among researchers concerning the type of residual lung volume (RLV) measurement that should accompany hydrostatic weighing for the determination of percent body fat (PF) in humans. Researchers have several methods from which to choose: measurement of RLV in air or underwater (actual), RLV calculated as a standard percentage of the vital capacity (predicted), and utilization of a constant, sex specific, volume (predicted). Therefore, two purposes were stated for this study: 1) the effect of total body submersion on RLV values in 99 college women and, 2) the effect of using actual versus predicted RLV values in the calculation of PF in 50 college women. Ss were 99 college women aged 17-26 ($\bar{X}$ 21.05 yrs), with a mean height of 163.7 cm (±6.7) and a mean weight of 62.7 kg (±9.1). The helium dilution method was utilized to measure RLV in air and underwater in conjunction with hydrostatic weighing for the determination of PF. Mean values for RLVair and RLVwater were 930 ml (±305) and 886 ml (±310), respectively. The mean value for PF calculated using RLVair was 21.65% and 22.05% using RLVwater. The results of the t-tests for correlated data indicated no significant difference ($p > .05$) between the RLV values measured in air or underwater ($t = 1.24$), and no significant difference ($p > .05$) between the calculated PF values ($t = -1.31$). PF was then calculated on a sub-sample of 50 women using a constant RLV value of 1000 ml and using 21% of the Ss vital capacity. The results of a one-way ANOVA ($F = 0.644$) indicated that neither of these calculated mean values of PF differed significantly from the mean values calculated using RLVwater ($p > .05$). It was concluded that for subjects of this investigation, total body submersion in water had no significant effect on RLV values. It was also concluded that using actual or predicted RLV values did not significantly change the mean PF value.

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April 15, 1981

3:30 p.m.

COMPARISON OF HYDROSTATIC WEIGHING AT RESIDUAL VOLUME AND TOTAL LUNG CAPACITY. Arthur Weltman, University of Colorado, Boulder; Victor Katch, University of Michigan.

Hydrostatic weighing (HW) was performed at both residual volume (RV) and total lung capacity (TLC) to determine if underwater weighing at extreme lung volumes affected the measurement of body density. Subjects were 72 middle aged males ($\overline{X}$ age = 43.4 years) and 51 middle aged females ($\overline{X}$ age = 40.2 years). Subjects were first assessed for underwater weight at RV for at least 10 trials. Subjects were then instructed to inspire maximally and hold their breath underwater for as long as they could. Three trials at TLC were used for assessment of underwater weight. Forced vital capacity and residual volume (oxygen dilution) were determined separately on land. Small but statistically significant differences in body density (D_b) were observed with the use of RV (1.0354 g/ml for men and 1.0196 g/ml for women) versus TLC (1.0367 g/ml for men and 1.0221 g/ml for women) ($p<.05$). Percent fat values for the RV and TLC data differed by only .5% for men and .9% for women. Results indicated that the difference between percent fat determination by HW at RV and TLC, while statistically different, is negligible. It was concluded that HW at TLC may be the method of choice for subjects who are uncomfortable with the technique of underwater weighing.

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April 15, 1980
3:45 p.m.

THE MAXIMUM OXYGEN UPTAKE, PULMONARY FUNCTION, BODY COMPOSITION, AND ECHOCARDIOGRAPHIC ANALYSIS OF TRAINED FEMALE DANCE MAJORS.

James H. Rimmer, Texas Woman's University; Joel Rosentswieg, Texas Woman's University; Bernard Rubal, Texas Woman's University.

Little information exists on the physiological profile of highly trained female dance majors. The purpose of this investigation was to determine the maximum aerobic capacity, pulmonary function, body composition, and echocardiographic analysis of eight highly trained female dance majors from Texas Woman's University during the summer of 1980. The average subject danced three to five hours a day, five days a week for a minimum of one year. The subjects had been dancing an average of 10 hours a week for the last five years. The Bruce treadmill protocol was used to determine the maximal work capacity. The generalized regression equations of Jackson, Pollock, and Ward were used to estimate body density. The descriptive data for each subject included, age ($\bar{x}$ = 24.4 yrs. ± 4.5), height ($\bar{x}$ = 165.4 cm. ± 7.6), weight ($\bar{x}$ = 55.1 kg. ± 6.4), resting heart rate ($\bar{x}$ = 62.7 ± 8.3), and resting blood pressure (110/74 mmHg ± 7.1/7.2). Pulmonary analysis revealed values of 3.6 l ± .45 for VC, 3.0 l ± .44 for FEV/1.0, and 99.8 l ± 23.5 for MVV. The mean BD of the dancers was 1.0529 ± .0097 while percent body fat was found to be 20.13% ± 4.27. Oxygen consumption at the voluntary maximum elicited a mean value of 52.4 ml/kg.min (3.0 l/min). M-Mode echocardiographic analysis indicated that left ventricular diastolic dimensions and volume were larger than typical. Percent body fat was well below the normal value. The results of this study indicate that these students of dance are in excellent cardiovascular condition and that dance would appear to be a viable contributor to aerobic fitness and weight control.

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April 15, 1981
4:00 p.m.

O_2 COST OF WALKING WITH AND WITHOUT VIGOROUS ARM SWINGING USING HAND WEIGHTS.

L. Borysyk, R.H. Dressendorfer, J.L. Smith, R. Goodfliesh, B. Franklin, S. Gordon, and G.C. Timmis, Division of Cardiovascular Diseases, William Beaumont Hospital, Royal Oak, MI 48009.

O_2 cost of walking at speeds below 4 mph (less than 100 meters per min) correlates highly with measured MET cost and is frequently used to prescribe home activity. Exercise prescription using this technique is adequate unless orthopedic or other cardiovascular problems prevent the individual from achieving the desired speed and prescribed MET expenditure. The purpose of this study was to ascertain if the energy cost of arm swinging using 12 oz. hand weights added to walking would raise the measured metabolic cost significantly to be useful as a training technique. The subjects were 6 moderately trained males, aged 19 to 37 (mean 27.7 years). Each subject walked 2.0, 3.0, and 3.5 mph first without weights then with weights swinging arms vigorously. As all 3 walking speeds were conducted in the same session, a ten minute rest period was inserted between speeds to allow the subjects to return to basal conditions reflected by heart rate and blood pressure. All subjects were previously exposed to the test protocol. Minute by minute expired gas analysis was accomplished using the Beckman metabolic cart. Over the 3 speeds tested, significant ($P<0.01$) increases were observed between walking without then with hand weights in volume of O_2 consumed, MET cost, and volume of air exchanged. Increases of 161.1, 192.2 and 205.6 mls. of oxygen were observed at 2.0, 3.0, and 3.5 mph respectively. These yielded corresponding MET increases of .52, .64, and 61 METS as well as significant ($P<.01$) increases of 2.2, 2.72, and 2.82 ml O_2/kg/min. While heart rate increases of 6.[illegible], 10.5, and 10.1 beats/min were significant ($P<.01$) over the 3 speeds, significant increases ($P<.05$) systolic blood pressure were only observed for 2 and 3.5 mph. This study reveals that arm swinging added to walking significantly increases variables which produce a training effect. The magnitude of the changes observed may well be within the training limits needed for sedentary normal as well as cardiac populations.

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April 15, 1981
4:15 p.m.

EFFECTS OF GLYCOGEN DEPLETION, SPEED OF MOVEMENT, AND BODY SIZE ON PULMONARY VENTILATION DURING BICYCLE ERGOMETRY.

George A. Brooks, Susan Turner, and Ellen F. Hughes; Exercise Physiology Laboratory; University of California, Berkeley, CA 94720.

To study the regulation of pulmonary ventilation during exercise, nine young, fit males were studied with a continuous, progressive test on a bicycle ergometer pedaling at two speeds (50 and 90 RPM), and under two dietary conditions (postabsorptive-normal glycogen, and glycogen depleted). Relative to the 50 RPM-normal glycogen condition (50-NG), pulmonary minute ventilation ($\dot{V}E$) during the 90 RPM-normal glycogen condition (90-NG) was significantly elevated at all work loads studied (300 kgm/min through maximum), but the ventilatory inflection point was unaffected. The ventilatory inflection point was defined as the work load where $\dot{V}E$ began an exponential rise. In comparison to 50-NG, blood lactate was elevated during 90-NG. Glycogen depletion significantly lowered blood glucose and lactate levels and delayed the lactate threshold. Lactate threshold was defined as the work load where blood lactate level began an exponential rise. The ventilatory threshold, however, was unaffected by glycogen depletion. Blood lactate correlated 0.98 with base excess in all conditions, and ketones, while elevated during GD, did not induce an acidosis. $\dot{V}E$ correlated better than 0.99 with $\dot{V}CO_2$ in each condition, but the $\dot{V}E/\dot{V}CO_2$, and $\dot{V}E/\dot{V}CO_2$ inflection points were different in each condition. Ventilatory and lactate inflection points were depressed 400 kgm/min in subjects less than 70 kg in comparison with subjects greater than 80 kg of body mass. $\dot{V}O_2$ did not differ because of body mass. Results suggest that factors other than $\dot{V}CO_2$ and blood pH effect $\dot{V}E$ during exercise.

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April 15, 1981
4:30 p.m.

ANAEROBIC THRESHOLD IN MALE AND FEMALE MARATHON RUNNERS.

Christine L. Wells and Audrey Lynn Haan. Arizona State Univ., Tempe, AZ. Human Performance Laboratory.

Nine male (age $\bar{x}$=37 years) and eight female (age $\bar{x}$=32 years) marathon runners performed a continuous, incremental treadmill test with either a grade or a speed increase each minute. Oxygen uptake, $\dot{V}_E$, $\dot{V}_{CO_2}$, ventilation equivalents for O_2 and CO_2 (VE_{O_2} and VE_{CO_2}) and R were measured for each 30 second inspired air measurement. The data was plotted and examined according to the methods of Skinner and McLellan (RQES 51:234, 1980), Reinhard et al. (Respiration 38:36, 1979) and Wasserman et al. (Appl. Physiol. 35:236, 1973) for anaerobic threshold (AT) and that point near maximal oxygen uptake at which metabolic acidosis is no longer compensated ("breakaway ventilation"). The male marathoners $\dot{V}O_2$ max was 3.919 l·min^{-1} and 55.9 ml·kg^{-1}·min^{-1}. AT occurred at 2.252 l·min^{-1} or 57.6% $\dot{V}O_2$ max. In the female marathoners, $\dot{V}O_2$ max was 2.767 l·min^{-1} and 53 ml·kg^{-1}·min^{-1}. AT occurred in the females at 1.794 l·min^{-1} or 65.3% $\dot{V}O_2$ max. The variables used to select AT were (1) the initial non-linear increase in $\dot{V}_E$ BTPS and $\dot{V}_{CO_2}$ STPD, (2) a rise in F_EO_2 and/or VE_{O_2} after reaching a minimum. Where variation in the selection of AT occurred among variables, a mid-point was taken. "Breakaway ventilation" signals that hyperventilation can no longer compensate for the marked rise in lactic acid production with strenuous work. This point was marked by a second non-linear increase in $\dot{V}_E$ (breakaway ventilation), and a second increase in VE_{O_2}. This point was markedly noticeable in 7 of the male subjects, and 5 of the female subjects. Non-compensated metabolic acidosis occurred at 3.728 l·min^{-1} or 94.6% $\dot{V}O_2$ max in the males, and at 2.633 l·min^{-1} or 95.2% $\dot{V}O_2$ max in the female runners. "Breakaway ventilation" was less marked in the female subjects. Perhaps this was due to the common observation among coaches of female runners that few will run past the "pain barrier."

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April 15, 1981
4:45 p.m.

THE EFFECTS OF ACUTE STRESS ON VENTILATORY pH. Frank Frisch; Kim Wood; and Nazaret Khodiguian, University of Southern California.

The purpose of this study was to study the effects of acute exercise on ventilatory pH. Data was obtained on 12 healthy males ($\bar{x}$ age = 23) who rode a bicycle ergometer to exhaustion. Expired air was directed through a modified Daniels valve in which a specialized pH electrode was fixed. The electrode was situated just outside the mouth. Gas flowing out the mouthpiece was then directed to a pneumotach and mixing chamber from which 500 ml/min aliquots of gas were drawn continuously. $\dot{V}E$ CO_2 02 and heart rate were monitored. ($\bar{x}$ max hr = 185, $\bar{\bar{x}}$ $\dot{V}O_2$ = 4.26 l/min, $\bar{x}$ $\dot{V}E$ max = 158 l/min. BTPS) This experiment tested the generality of earlier work which has shown that arterial PCO_2 and pH oscillate with every breath. While the mean of pH was constant, both amplitude and period of oscillations changed as work increased. (Range pH = 6.83-7.84, period = 12 - 60/min.). Oscillations corresponded to each breath. Significant changes were found to exist close to the anaerobic threshold as measured by $\dot{V}E$ and $\dot{V}CO_2$. Results suggest that (1) as the correlation of $\dot{V}E$ and $\dot{V}CO_2$ is strong in both steady state and transient metabolic conditions ventilatory pH might serve as a non-invasive early indicatory of arterial changes, and (2) ventilatory pH may provide support for the role of H^+ and $PaCO_2$ as the signal in the control of ventilation.

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April 15, 1981
5:00 p.m.

EXERCISE TESTING FOR EARLY DETECTION OF VENTILATORY IMPAIRMENT IN TEENAGE SMOKERS. R.H. Dressendorfer, L. Borysyk, J.L. Smith, R. Goodfliesh, S. Gordon, and G.C. Timmis, Division of Cardiovascular Diseases, William Beaumont Hospital, Royal Oak, MI 48009.

Secondary prevention of chronic bronchitis and emphysema due to cigarette smoking depends largely on detection of obstructive lung disease in its early and still reversible stage. Our purpose was to determine if non-invasive pulmonary stress testing would be useful in screening for obstructive lung disease in teenage smokers. Twenty-four apparently healthy, untrained boys, aged 16 to 18, participated as subjects. Twelve had smoked more than 20 cigarettes per day for over five years. The other 12 boys were similar to the smokers in age, height, weight, and percentage body fat, and served as a control group of non-smokers. Resting pulmonary function tests showed no significant difference between groups in vital capacity, residual volume, total lung capacity, and timed expiratory volumes. The groups did not differ in resting heart rate (HR), resting blood pressure (BP), maximum HR, maximum BP, or electrocardiographic responses to graded treadmill exercise. Maximal oxygen consumption averaged 3.38 L/min (48.0 ml/kg/min) for the smokers and 3.50 L/min (50.2 ml/kg/min) for the non-smokers, the difference between groups not being statistically significant. There was also no significant difference in exercise tidal volume or respiratory exchange ratio. However, the smokers had 17% lower breathing frequency, 19% lower expired minute volume, and 16% lower ventilatory equivalent for oxygen uptake at the point of volitional fatigue, all of which were highly significant ($P < 0.01$). Exertional dyspnea was reported more often by the smokers. Thus, the smokers breathed less during maximum exercise because of a lower respiratory rate, despite similar carbon dioxide production. These findings are suggestive of greater airway resistance in the smokers with compensation by increased pulmonary oxygen extraction. This study reveals an association between chronic teenage smoking and reduced maximum exercise ventilation. Impaired ventilatory capacity on pulmonary stress testing may be an early sign of obstructive lung disease.

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April 15, 1981
5:15 p.m.

INFLUENCE OF VARIOUS FREQUENCIES OF INTENSIVE AEROBIC EXERCISE ON RELATIVE CORONARY CIRCUMFERENCE INDEX.

Robert Haslam, Syracuse University.

In 1954 it was found that a relative coronary circumference index (RCCI) was inversely related to the occurrence of myocardial infarction in humans. The present study determined the effects of intensive swimming 0, 1, 5 and 10 times per week on this index which was determined by dividing cardiac ventricular wet weight by the sum of the circumferences of the right and left main coronary arteries. Sixty-nine Wistar rats swam continuously for durations which were progressively increased from 30 to 51 minutes while carrying loads which were increased from 1.0 to 2.25% of individual body weights over 10 weeks. At the conclusion of training, hearts were fixed in 10% buffered neutral formalin, routinely stained with hematoxylin and eosin and analyzed for RCCI, coronary circumferences, heart mass, regressed heart mass and body mass. Data were analyzed for linear, quadratic and cubic trends relative to exercise frequency. Mean values for RCCI were 98.82, 99.16, 91.04 and 90.21 mg per planimeter unit for groups exercising 0, 1, 5 and 10 times weekly ($p < .01$ for linear trend). Ventricular wet and dry weights were determined and regressed on body weight to test for cardiac hypertrophy. Regressed mean ventricular dry weight illustrated expected significant linear increases of 4.89, 5.66, and 6.12% over sedentary control rats. A quadratic relationship resulted from analysis of regressed ventricular weight. An analysis of RCCI using dry weights (instead of wet weight) resulted in a significant linear relationship ($p < .01$). Further analyses resulted in nonsignificant first, second and third order trends for tight coronary circumference, left coronary circumference, summed coronary circumferences, and absolute ventricular dry weights.

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April 15, 1981
5:30 p.m.

RIGHT AND LEFT VENTRICULAR WEIGHTS IN WHITE RATS EXPOSED TO SIMULATED ALTITUDE OR SWIMMING. Colleen George, Texas Tech University School of Medicine; Michael T. Kopetzky, Texas Tech University School of Medicine.

General response to various stressors is uniform; a particular organ may, however, respond in specific ways. The heart is an example of such an organ. Acclimatization to chronic hypoxia of high altitude is associated with morphological and metabolic changes in right ventricle. Exercise is associated with morphological and functional changes in left ventricle. The purpose of the present study was to determine differences in the mass of right and left ventricles as a result of acclimatization to simulated high altitude or exercise as stressors. Sixteen Sprague-Dawley rats were used in the experiment. Within litters, animals were matched for body weight and randomly assigned to one of four groups: altitude acclimated, altitude control, exercise acclimated, and exercise control. Twenty thousand-foot altitude was simulated in vacuum chambers. Exercised animals swam in a fiberglass tank (61 cm X 61 cm X 71 cm). After eight weeks of acclimatization, the animals were killed by bleeding and hearts dissected for right and left ventricles and septum. The portions were weighed and a standard formula utilized to apportion septal weight to right and left ventricles. Hematocrits, hemoglobin, and adrenal weights were determined as measures of stress acclimatization. The F ratio for stressor X ventricular weight interaction and Duncan's Multiple Range Test revealed differences in right and left ventricular weights were associated with the kind of stress imposed. The probability of the differences was less than 0.05. Differences may be related to increased pressure load in the case of altitude stress and to increased volume load in the case of exercise stress. Different stress-induced changes in cardiac mass have important implications for alterations in dynamic function of right and left ventricles. Techniques have subsequently been developed in this laboratory for simultaneously measuring dP/dt and other functional parameters of right and left ventricles in altitude and exercise acclimated rats.

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April 15, 1981
5:45 p.m.

MAXIMUM WORK CAPACITY OF ADOLESCENT INDIVIDUALS WITH IDIOPATHIC THORACIC SPINAL DEFORMITIES.

Patrick DiRocco; William Reddan; Alan Breed; and James Carlin, University of Wisconsin.

The purpose of this study was to determine cardiopulmonary responses to progressive exercise in adolescent individuals with thoracic spinal deformities. 14 females (12-18 years) who were being treated with a Milwaukee Brace were studied. One subject (S) had a thoracic kyphosis (54°) and the remaining 13 Ss had thoracic scoliotic curves (19° to 47°). Each S was given a progressive treadmill test (Balke Protocol) to the level of maximum volitional effort ($\bar{X}$ max. HR was 188 and max. grade was 19°). Heart rate (HR) and ventilatory response was continuously monitored and O_2 and CO_2 exchanges were determined every 4 minutes of the test. Ss were tested once in their brace and once out of their brace. No significant difference in maximum work capacity between brace and no-brace performances were observed. When compared to maximum work capacity of nonhandicapped age group peers, all Ss were more than 1 standard deviation below the age group $\bar{X}$s in $\dot{V}O_2$ max. and they had markedly higher $\dot{V}E$ max, (f max. and $\dot{V}T$ max.) and $\dot{V}E/\dot{V}O_2$ max. The hyperventilation ($\dot{V}E/\dot{V}O_2$) and increased ventilatory effort (f and $\dot{V}T$) suggest an inefficient response to maximum progressive work. Past evidence has shown that individuals with severe thoracic curves (>60°) have reduced pulmonary responses to exercise. The results of this investigation lead the authors to conclude that even mild thoracic deformities negatively effect the maximum work capacity of individuals with these disorders.

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April 16, 1981
10:30 a.m.

THE EFFECT OF HYDROCEPHALUS ON APRAXIC TENDENCIES IN CHILDREN WITH MENINGOMYELOCELE. Denis Brunt, Louisiana State University.

Based on the results of a computerized topography scan subjects were assigned to a dilated ventricles (DV) group (n=7) or the no ventricular dilation (NVD) group (n=7). To establish the presence of an apraxic condition i.e. the inability to motor plan, the following paradigm, as outlined in the adult literature, was investigated. Firstly, the performance of spontaneous, simple, single movements to a verbal cue may be defective and little improvement is expected on visual cue. Secondly, motor sequences may be defective to a verbal cue but significant improvement appears to a visual cue. The subjects performed to verbal and then visual cues eight simple gestures and then under the same conditions nine motor sequences. Three points were given for a flawless performance, two if errors were corrected and one point for an approximation of the movement. A 2 X 2 (group X cue) design, with repeated measures on the last factor, was used to analyze the subject's performance. Age was covaried in the analysis and the .05 level of confidence was accepted as statistically significant.

On simple movements there was a significant group X cue interaction. The DV group, significantly inferior on the verbal cue, improved noticeably to the visual cue. For the NVD group, such improvement was unlikely due to a 'topping out' effect to the verbal cue. On movement sequences there was a significant cue and group effect. Both groups improved to the visual cue with the NVD group being consistently superior.

The notion of adult apraxia was not substantiated. Unlike classical apraxia, the children showed improvement to a visual cue on simple movements but not so emphatically on complex sequences. Meningomyelocele children without hydrocephalus were superior to their hydrocephalic peers on both movements to a verbal cue and also on motor sequences to a visual cue.

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April 16, 1981
10:45 a.m.

EFFECTS OF TIME AND OCCURRENCE UNCERTAINTIES UPON REACTION TIME OF MENTALLY HANDICAPPED PERSONS. Paul R. Surburg, Indiana University.

Implementation of foreperiod variation as a function of time uncertainty and probability of stimulus presentation as a function of occurrence uncertainty in reaction time (RT) measurement has methodological and possible pedagogical implications. Effects of both time and occurrence uncertainties upon RT of mentally handicapped individuals has not been investigated. The purpose of this study was to determine the effects of time and occurrence uncertainties upon RT of mildly mentally handicapped persons. Thirty-three students (mean I.Q. 65) from Bloomington High School North participated in this study. Elapsed time from stimulus presentation until key release constituted RT; this sequence was preceded by a warning signal. Randomly varied foreperiods of 1.5, 3.0 and 4.5 seconds were presented to all subjects. A catch trial consisted of a warning signal without stimulus presentation. Twenty-one recorded trials constituted a testing session; subjects were tested over a four-day period. The following treatment groups were established by random assignment of subjects: no catch trials, 10 percent catch trials, and 20 percent catch trials. A three-way ANOVA with two repeated measures (treatment groups x days x forperiods) indicated significant main and interaction effects for treatment groups, days, and foreperiods. Subsequent analyses for simple interaction effects and simple, simple main effects revealed that between the third and fourth days of testing, occurrence uncertainty has a different effect upon the dependent variable. Time uncertainty had a significant effect upon RT throughout the experiment. RT's following 3.0 and 4.5 seconds were significantly faster than RT measurements following a 1.5 second foreperiod. These results as well as other findings have methodological implications for testing mentally handicapped persons.

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April 16, 1981
11:00 a.m.

A STUDY OF PHYSICAL FITNESS LEVELS OF MENTALLY HANDICAPPED CHILDREN AND ADOLESCENTS IN ILLINOIS.

Carl Eichstaedt, Illinois State University; Peter Y. Wang, Illinois State University.

During the 79-80 school year, 43 Illinois schools and agencies participated in the administration of a 7 item physical fitness test battery, including the flexed arm hang, bent knee sit-up for 60 seconds, standing long jump, softball throw for distance, 50 yd. dash, 300 yard run, and the 30' block exchange shuttle run. $N = 1{,}548$ mentally handicapped subjects. Ss included 802 M and 646 F, with ages between 4 and 64. The Ss were further grouped into 3 subsets, the mildly (Mi) mentally handicapped (N=344), the moderately (Mo) mentally handicapped (N=854), and the Down's syndrome (Do)(N=350). There was no sig diff ($p > .05$) between the Mo and the Do Ss on 5 test items, but a .01 sig diff was found with the Mo>Do in the shuttle run and the 300 run. Two "t" tests were used to compare male Mo and male Do; and female Mo and female Do. These comparisons indicated that a sig diff only occured in the shuttlerun with the female Mo Ss > the female Do Ss. The results of this study indicate that the selected sample of Illinois Mi mentally handicapped Ss are, as a group, inferior in general levels of physical fitness when compared with national Mi handicapped S norms. These findings should suggest that more emphasis is needed to increase the opportunity and intensity for physical fitness activites for those Ss in Illinois classified as Mi mentally handicapped. This responsibility must be commonly shared by public schools, local recreation departments, and local Special Olympic organizations. Another finding reveals that the physical fitness levels of both Mo Ss and Do Ss are almost identical. In addition, their combined group scores closely align with those found in national Mo handicapped S norms. Thus, as is presently done in academic settings, these two general groups can be considered similar in physical fitness ability and can be placed and taught together in physical fitness activities. Specific differences were also found to occur within age groups, as is found in normal populations. Therefore, it is appropriate to place mentally handicapped individuals within appropriate chronological age groupings, although the key to successful placement stems from the results of an initial testing of the individual's existing level of fitness. Pre-test results will dictate whether the S should be placed in a regular program or into a highly individualized adapted physical education setting. Flexible scheduling, which would allow placement into both environments, is highly desirable.

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April 16, 1981
11:15 a.m.

THE EFFECT OF A HOME LEARNING PROGRAM ON THE BALANCE PROFICIENCY OF ELEMENTARY AGED LEARNING DISABLED STUDENTS. Michael A. Horvat, University of Nevada, Las Vegas.

The purpose of this investigation was to determine the effect of a structured gross motor home learning program on the balance proficiency of elementary aged learning disabled students. Parents of children who manifested state and dynamic balance defects were assigned to experimental groups based on pretest scores. Parents in Experimental Group One (E_1) implemented a home learning program which consisted of static and dynamic balance tasks while the home learning program for Experimental Group Two (E_2) consisted of fine motor and academic tasks. Each home learning program was conducted three days a week (12 weeks) for 30 minutes per session. A Control Group (C) was also selected from the original sample and matched on pretest scores with the two Experimental Groups. All groups then participated in a school physical education program conducted by a special physical educator twice weekly (12 weeks). A *Mann Whitney U Test* (Siegel, 1956) was utilized to determine significant differences within groups on static and dynamic balance scores. Based on the comparisons of E_1 to E_2 and E_1 to C, significant differences were indicated for static balance ($p > .01$) and dynamic balance ($p > .05$), while the comparison of E_2 and C resulted in no significant differences ($p > .05$) in static or dynamic balance. In addition, a *Wilcoxon Matched Pairs Signed Ranks Analysis* (Siegel, 1956) was applied to compare pretest and posttest scores between groups. Based on the results of this analysis performance improved significantly on static and dynamic balance ($p > .05$) while pretest and posttest comparisons of E_2 and C resulted in no significant differences ($p > .05$) on any of the dependent variables. As a result of this investigation it was concluded that parents can significantly enhance the balance proficiency of primary aged learning disabled students by implementing a structured gross motor training program in the home.

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April 16, 1981
11:30 a.m.

THE EFFECTS OF A GROUP-ORIENTED CONTINGENCY MANAGEMENT SYSTEM ON BEHAVIORALLY DISORDERED STUDENTS IN PHYSICAL EDUCATION.

E. William Vogler, University of Colorado, Boulder, Colorado, 80309.

An ABAB time-series design was utilized to determine the effectiveness of an interdependent group-oriented contingency management system in modifying on-task behavior of behaviorally disordered students in a physical education setting. A younger group (n = 12) with a mean age of 7.8 years, and an older group (n = 11) with a mean age of 11.2 years participated in a study in which activity reinforcement for each group was contingent upon correct observation of the rules established for class. It was indicated in the results that the group-oriented system was significantly effective in increasing the percent of on-task behavior of both groups of students. In addition, there was no significant difference in the response to treatment between younger and older students, and there were no individuals within each group who did not respond favorably to treatment.

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April 16, 1981
11:45 a.m.

OBSERVING AND ASSESSING THE MOTOR BEHAVIORS OF HANDICAPPED AND NORMAL STUDENTS IN A REVERSE MAINSTREAMING SETTING.

Anne Beuter, University of California-Berkeley.

The principal purpose of this study was to determine whether the integration of normal and trainable mentally retarded (TMR) students in a motor activity program would yield significant differences between the mean scores of the motor performances of integrated and non-integrated students. A secondary purpose was to determine through discriminate analysis which of the process variables (of the three tasks of running, jumping, and throwing) separated the good from the poor performers. Three times a week for five months, each of the six classes composed of twenty normal (elementary school boys and girls) and five TMRs follow the physical education program designed to develop gross-body coordination, balance, flexibility, strength, speed, and power. Three tests assessing fundamental motor patterns (30-yard dash, standing broad jump, and softball throw for distance) were administered at the beginning and at the end of the program. A t-test comparing the performances of integrated and non-integrated students failed to show any significant differences ($p > .05$) in either jumping or throwing. A significant difference than ($p < .05$) favoring the non-integrated group occured in the running test. Video documentation analysis and performance results were then used to generate an average of ten process variables per motor test. Discriminate analysis was used to determine the most meaningful variable separating good from poor performers. These variables were (1) running (step frequency, ankle angle, and shoulder angle, 80 percent) and (2) jumping (angle at take off, flexion of hips, angle of arm at preparation, 90 percent).

Anne Beuter, Physical Education Dept.
Harmon Gym, U.C.-Berkeley
Berkeley, CA 94720

April 16, 1981
12:00 noon

ADMINISTRATOR INSERVICE TRAINING FOR PROGRAM IMPLEMENTATION IN ADAPTED AND DEVELOPMENTAL PHYSICAL EDUCATION.

J. Ellen Cowden, The University of New Orleans.

Inservice training workshops for program implementation in ADPE were presented to 25 administrators of the Fort Bend ISD, Stafford, Texas, in three half day sessions. Information about present practices and conditions, their importance, and the intent of the participants to implement the ADPE program was obtained from an Administrator Opinion Survey to which the S's responded prior to the presentation of the first workshop training session and again one month after completion of the workshops. The purpose of the study was twofold; to originate and develop inservice education workshops in ADPE and to determine the suitability and effectiveness of the workshops. Procedural steps for developing and presenting the workshop content were carried out. Consideration of whether the second objective was accomplished to determine the effectiveness of the workship required notation of actions resulting from the workshop, recording verbal comments of the participants and statistical analysis of responses to the administrator survey. It was concluded that the content developed for the workshops for program implementation in ADPE are appropriate for use with public school administrators. In order to demonstrate the effectiveness of such workshops, however, it seems desirable for training sessions to be limited to personnel having similar job responsibilities.

Jo Ellen Cowden
Dept. Health & Physical Education
The University of New Orleans
New Orleans, LA 71022

April 16, 1981
12:15 p.m.

CALORIC COSTS OF DISCO DANCING. Philip E. Allsen, Brigham Young University; Ernie T. Anderson, Hardin-Simmons University; and Michael L. Calhoun, Kennesaw College.

The purpose of this study was to determine the caloric expenditure of disco dancing at three selected dance tempos. The tempos were fast (190 + beats per min), moderate (145-190 beats per min) and slow (138-145 beats per min). Four experienced disco dancers, two males and two females, were used as the subjects in the study. Subjects were exercised on a treadmill and expired gases were collected and analyzed to determine caloric expenditure at selected heart rates. The couples were then randomly assigned to dance at fast, moderate, and slow tempos in a dance disco environment. Heart rates were monitored by recording the heart beats as transmitted by a telemetry system attached to each subject. By using the collected heart rate data it was possible to determine the average caloric expenditure for the selected tempos for each subject, and by using the subject's body weight, computations were made to determine calories per minute per pound for each subject. A combination of all the data indicates that approximately .095 calories/minute/pound are expended in the slow tempo. The caloric cost of disco dancing can now be predicted and utilized in writing exercise prescriptions.

Philip E. Allsen
269 SFH Brigham Young University
Provo, Utah 84602

April 16, 1981

1:15 p.m.

VOLITIONAL CONTROL OF HEART RATE RESPONSE DURING TREADMILL
WALKING. Cheryl J. Cohen, Nancy E. Nienhuis and Rosemary Aten,
Western Illinois University.

The present American lifestyle is one of rapid change and high stress. Indications are that this lifestyle may be one of the causes of the increasing incidence of heart attacks and related disorders. Also indicated is the relationship of heart disease to job-induced anxiety. A portion of the previous research has dealt with volitional control of heart rate; this research has yielded conflicting results. In addition, few studies have dealt with the specific problem of heart rate control during exercise. It was the purpose of this study to determine whether Ss could maintain volitional control of heart rate during a state anxiety stress condition, once bidirectional heart rate control had been achieved while exercising on a treadmill. Ss were 11 femlaes, aged 18-22 years. All Ss participated in 10 training sessions, during which they attempted to learn bidirectional heart rate control during treadmill walking; in addition, all Ss participated in one final experimental session, during which their ability to lower heart rate under state anxiety stress was tested. An analysis of variance with repeated measures design was applied to the collected data; correlation coefficients and trend analysis were also utilized. There was no significant difference between any sessions in the ability to raise or lower heart rate on command. Ss were able to demonstrate ability to exercise bidirectional heart rate control, however, this ability did not significantly improve across the 10 training sessions. When heart rate lowering ability during the final state anxiety sessions was compared with all other sessions, a significant difference was demonstrated; the largest increase in ability to lower heart rate occurred during the final anxiety testing session. The Ss in this study were able to achieve bidirectional heart rate control while exercising on a treadmill, although training sessions did not produce a significant learning effect. Furthermore, when anxiety was added, these Ss were able to maintain volitional heart rate control despite the fact that this stress initially produced a sharp heart rate increase. It was therefore concluded, within the limitations of this study, that heart rate control was possible during exercise conditions; and that this control could be applied during a state anxiety stress situation. The question of whether this demonstrated control could be transferred to lessen the anxiety effects of the initial stages of a heart attack, and thereby reduce mortality rates, requires further study.

Dr. Cheryl J. Cohen
Human Performance Laboratory
Western Illinois University
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April 16, 1981
1:30 p.m.

THE RATE OF TENSION DEVELOPMENT IN MALE AND FEMALE ROWERS.
Sheryl Tessler Zigon, University of Massachusetts.

The purpose of this study was to compare absolute and relative rates of tension development in similarly trained male and female athletes. Sixteen members of the University of Massachusetts Men's and Women's Crew Teams performed maximal isometric knee extensions and plantar flexions as quickly as possible. The first second of each tension-time curve was digitized using a sonic Graf-Pen and a NOVA 3 minicomputer system. The absolute tension-time measures consisted of maximum slope and the amount of tension reached at 50, 100, 500 and 1000 msec. The relative tension-time measures consisted of the time needed to reach 15%, 50%, and 90% of peak tension. Statistically significant differences were found between men and women on all knee extension measures except peak tension and time to 90% of peak tension. The women's peak tension was 82% of the men's, while their peak rate of tension development (maximum slope) was only 55% of the men's. The largest differences between men and women were found in the early part of the knee extensor contraction. It took the women 50% longer than the men to reach 15% of peak tension, while no differences were found between the sexes in the time needed to reach 90% of peak tension. In contrast, there were no sex differences in the relative rate of plantar flexor tension development. The women's tension levels were approximately 70% of the men's throughout the tension-time curve. Thus, men had faster absolute rates of tension development than the women in both muscle groups. The men were also able to reach the same proportion of their peak knee extensor tension in less time than the women, suggesting differences in either fiber type composition or motor unit recruitment patterns.

Sheryl Tessler Zigon
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April 16, 1981
1:45 p.m.

THE EFFECTS OF ISOKINETIC TRAINING AT PEAK INSTANTANEOUS POWER UPON KNEE EXTENSOR TORQUE IN THE SPASTIC CEREBRAL PALSIED.

Peggy M. Lasko, San Diego State University; and Samuel Britton, California State University, Northridge.

Peak instantaneous power (IP) output of the knee extensors has been shown to occur at considerably slower angular velocities (60-180°/second) in ambulatory subjects with spastic cerebral palsy, as compared to normal untrained subjects (240°/second). This study was designed to examine the effects of training isokinetically, at a velocity determined by peak IP, upon knee extensor strength in subjects with spastic cerebral palsy. Twelve subjects with knee flexion contractures, ages 16-33 years, were tested pre, mid, and posttraining for maximal knee extensor at six specific angular velocities on an isokinetic dynamometer (Cybex II, Lumex Inc.). The velocity at which peak IP occurred was computed for each individual. Subjects were assigned to either (1) control group (n=6), or (2) experimental group (n=6) receiving isokinetic exercise. The experimental group trained on the Cybex II four times per week for a period of six weeks. The daily training regime consisted of four bouts of knee extensions at the individually determined peak IP velocity (120°/second or 180°/second), with rest intervals of one minute each. The control group abstained from any exercise or therapy involving the knee extensor group for the six week period. As a result of the training program, the experimental group significantly ($p < .01$) increases knee extensor torque at the training velocity by 31%. In four of the six subjects, peak IP shifted to the next highest velocity tested. These results indicate that isokinetic training at a velocity where peak IP output occurs may significantly increase knee extensor torque at more functional performance velocities (e.g. walking speed) in individuals with spastic cerebral palsy, even when the muscle is opposed by a spastic antagonist.

Peggy M. Lasko, Department of
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University, San Diego, CA 92182

April 16, 1981
2:00 p.m.

COMPARISON OF TWO METHODS FOR DETERMINING POWER OUTPUT.

John Clayton, Northeastern University, Boston, Massachusetts.

Recently it has been suggested that power output in human muscle be determined only to the point of maximum velocity in the range of motion for the movement being analyzed. Consideration of the relevant parameters after this point generally results in conservative estimates of power output since a phase of deceleration is entered, and thus, much less demand is placed on the working muscles. The purpose of the present study was to attempt to compare values obtained for power output to the point of maximum velocity during a loaded contraction with values for power output obtained by utilizing data for the full range of motion. Furthermore, it was of interest to ascertain whether the magnitude of the load would influence the nature of the findings. Thirty-two male university students were tested for a maximal voluntary contraction (MVC) on the bench press station of a Universal Gym. In subsequent sessions Ss were evaluated for power output on the bench press at loadings of 30%, 60%, and 90% of their MVC. A mechanical device which coupled the bench press station to a Honeywell chart recorder provided displacement curves from which power output was derived. Analysis of the data, comparing the power output over the full range of motion to the power output until the point of maximum velocity, revealed that there was no significant difference between the values obtained at any of the comparative loadings - the accompanying F ratios for the 30%, 60%, and 90% loadings being all less than 1. Also, the correlation coefficients between the two conditions were .93 at 30%, .99 at 60%, and .99 at 90%. Practical methods of measuring power output typically do not yield information concerning the point of maximum velocity, however, the present data indicate that the values obtained for power output over the full range of motion provide a valid and reliable estimate of power output to the point of maximum velocity.

John Clayton
Department of Physical Education
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April 16, 1981
2:15 p.m.

THE MEASUREMENT OF ISOTONIC STRENGTH IN COLLEGE MALES ON THE UNIVERSAL GYM: CONTROLLING FOR INDIVIDUAL DIFFERENCES IN BODY WEIGHT.

Allen Jackson, Robert W. Patton, and Mark Watkins, North Texas State University.

Previous research (Jackson, Watkins and Patton, 1980) has demonstrated that individual differences in body weight have an adverse effect on the validity of isotonic strength and endurance measures. Primarily factor analytic findings have demonstrated that the underlying structure of the isotonic strength domain is only clearly delineated when individual differences in body weight are statistically controlled. In particular two factors associated with the arms and the legs have been isolated. The two most valid measures of these factors were a bench press test and a lower leg press test. The purpose of the present investigation was to develop a normative method for evaluating maximum bench press and leg press strength of college males on the universal gym that controlled body weight. College males (N = 88) enrolled in weight training classes for twelve weeks were tested for their maximum leg and bench press strength using procedures adopted by Berger (1962) with reliabilities of .82 and .91 respectively. Body weight was also determined for each individual. Significant correlations were found between the body weight and the maximum bench press (.452) and the lower leg press (.619). Due to the observed phenomenon that correlations and regression statistics vary from sample to sample the upper and lower limits of a potential r^2 change between body weight and the tests were computed to be .28 and .01 for the leg press and .23 and .01 for the bench press. Bivariate regression equations were developed with body weight predicting the leg press and bench press test scores. A predicted score was calculated for each subject using the equations. Residual scores free from the influence of individual differences in body weight were determined for each subject by subtracting the predicted scores from the observed scores. Percentile rank norms controlling the influence of body weight were developed. This was done by calculating percentile ranks on computed residual scores and applying these to predicted test scores calculated for individual body weights each 10 lbs. from 220 lbs. to 110 lbs. These norms are valid only for college males involved in weight training programs being tested for maximum isotonic strength on the universal gym. The norms are not applicable to different populations or different muscular strength assessments. The completed norms are available to the reader upon request to the first author.

Allen Jackson, Division of Physical
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April 16, 1981
2:30 p.m.

EFFECTS OF EXERCISE TYPE AND INTENSITY UPON KNEE EXTENSOR FRACTIONATED REACTION TIME. Gary Kamen, Indiana University.

Recent studies have noted little change in the premotor time (PMT) or central component of total reaction time following fatiguing exercise. Also, it has been suggested that isometric and isotonic exertion may produce differential responses under fatiguing conditions. The purpose of this study was to assess the effects of isometric and isotonic exercise upon fractionated knee extensor reaction time under resisted and non-resisted movement conditions in 12 college-age males. The task involved the presentation of a visual stimulus, to which the subject responded with a rapid knee extension. In one RT condition, the subject was required to overcome a resistance equal to 15% of the maximal voluntary contraction (MVC) which was applied to the subject's foot. The first two days allowed for baseline stabilization of total reaction time, which was partitioned into a central component (PMT) and a peripheral muscular component (motor time-MOT) using an electromyographic technique. On each of the last four days, one of four exercise tasks was given. The isometric holding time tasks required the subject to hold a weight equal to 25% or 50% of his MVC for as long as possible with his knee extensors. For the two rhythmic isotonic tasks, the subject lifted a weight equal to 25% or 50% MVC as many times as possible. Fractionated reaction time was assessed following each of four exercise bouts. Although none of the exercise regimens effected significant changes in unresisted MOT, a significant increase ($p < .01$) was observed in resisted MOT following all four exercise conditions. In addition, a lengthening of both unresisted and resisted PMT was seen following the high intensity isometric and the low intensity isotonic conditions, while PMT significantly quickened following low intensity isometric and high intensity isotonic exercise, resulting in significant Type x Level x Bout interactions. It is concluded that: 1) fatiguing exercise may effect an alteration in the central RT component, and 2) increases in resisted MOT following fatiguing exercise appear to be unrelated to the nature of the exercise task.

Gary Kamen
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April 16, 1981
2:45 p.m.

FRACTIONATED SIMPLE AND CHOICE RESPONSE TIMES IN WOMEN BY AGE AND ACTIVITY LEVEL. Barbara A. Hart, University of Wisconsin-Milwaukee.

A lifetime habit of participation in vigorous physical exercise has been associated with the maintenance of efficient neuromuscular performance into old age. It was the purpose of this study to evaluate the effects of age and activity level on the neuromuscular performance parameters described by fractionated knee extension response time under simple and choice conditions. A total of 60 female subjects were selected into four age/activity categories: young active, young inactive, old active and old inactive. During test sessions on each of three consecutive days subjects performed 24 simple and 24 choice response trials divided into two blocks and separated by rest periods. For choice trials the response was to kick one of three targets corresponding to one of three stimulus light sources. For the simple condition only the center light and target were used. A repeated measures analysis of variance and an intraclass correlation procedure were employed to assess the stability and reliability of measures. For the criterion measures analyzed (premotor, motor and movement time) the old inactive subjects produced the longest times, followed, in order, by the old active, young inactive, and young active groups. A three factor analysis of variance revealed significant differences ($p < .01$) between age categories and between test conditions for all three criterion measures. Activity group differences failed to reach the level of significance ($p < .05$). The most pronounced group differences were found for the measure of premotor time which ranged from 131.60 msec for the young active group to 201.24 msec for the old inactive group under the simple condition. Under the choice condition the corresponding values were 159.27 msec and 255.80 msec. The additional central processing burden of the choice condition evidently is felt to a greater degree by the older subjects as evidenced by the greater increase in premotor time from simple to choice conditions. These difference values were 49.41 msec and 38.74 msec for the pooled old and pooled young subject groups respectively. The findings of this study substantiate the observed increase in response time, particularly in the decision-making component (premotor time), demonstrated by older individuals. Although statistically significant differences were not found between the two activity groups, the data indicate a tendency for response speed to be enhanced by a life habit of physical activity.

Barbara A. Hart, Ph.D.
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April 16, 1981
3:00 p.m.

DETERMINING TEACHER COMPETENCY THROUGH A RESEARCH TRAINING MODEL.

David Auxter, Slippery Rock State College.

The purpose of this study was to develop a teacher competency on pupil acquisition of skill through the individual education program (P.L. 94-142). Teacher competency was determined through the attainment of a criterion referenced test on a swimming task by the mentally retarded. The competency was developed through the application of the research teaching model which is as follows: If one uses these hierarchical programmed curricula, with teachers trained in these ways, under these conditions, one will get these results, with these learners. Thus, the problem of this study was for a teacher trained to conduct the instructional process of the Individual Education Program of P.L. 94-142, using hierarchical programmed swimming curricula. This was to determine the percent of mentally retarded children that could acquire criterion levels of mastery of a swimming behavior over a specified instructional time frame. The hierarchical programmed curricula for this study involved the sequential reduction of floatation and increments in the distance the subjects could swim over time. Progress was measured as a function of the distance that one could swim and the amount of floatation which was required to aid the subject to meet specific short term instructional objectives. The teacher who conducted the study had attained the following competencies: a) mastery of the instructional process of the Individual Education Program, b) mastery of the behavioral technology to enable progression of the subjects in the programmed instruction, c) mastery of procedures to train an aid to apply the behavioral technology. Twenty-five mentally retarded persons between the ages of 14 and 18 practiced 4 times a week for 25 minutes per session for 4 weeks. This was a total of 400 minutes of instruction. There was one teacher and an aid to instruct a group of 7 persons. The criterion level of swimming proficiency for beginning swimming was 25 uninterrupted yards. Thus, the results were expressed in the percent of mentally retarded persons who could swim the criterion distance after 400 minutes of instruction. The conclusion of the study was that a swimming instructor with an aid should be able to teach a class of 17 out of 25 trainable mentally retarded children between the ages of 14 and 18 (68%) to swim a distance of 25 uninterrupted yards after 400 minutes of instruction.

Dr. David Auxter
Slippery Rock State College
Slippery Rock, PA 16057

April 16, 1981
3:30 p.m.

RELATIONSHIP OF JOB SATISFACTION, ROLE PERCEPTION, AND PERCEIVED SUCCESS OF COLLEGIATE ATHLETIC ADMINISTRATORS.

Robert A. Oliver, Slippery Rock State College; Dewayne J. Johnson, Florida State University; William L. Herman, Slippery Rock State College; Keith Driftmeir, Slippery Rock State College.

The purpose of this investigation was to analyze the job satisfaction of athletic directors, specifically looking at the effect on job satisfaction of the perception of the athletic director's role and degree of success as viewed by self and the associate athletic director. Athletic directors and associate athletic directors from 25 colleges served as subjects. The athletic directors were asked to complete three instruments related to their job. These were: (1) a 50-item job satisfaction instrument which yielded 12 sub-scores and a total job satisfaction score, (2) a 28-item role perception questionnaire which yielded 3 sub-scores and a total role perception score, and (3) a 13-item perceived success questionnaire. The associate directors were asked to complete two instruments related to their athletic director's position. These were the 28-item role perception and 13-item perceived success instruments. All instruments were constructed and scored following the summative model with a Likert scale from 1-5. Pearson product-moment correlation was calculated for all sub-scores and total scores. The t-test was used to determine if differences existed between the athletic director and the associate on perceptions of role or degree of success. Stepwise multiple regression was run using two separate sets of independent variables (job satisfaction sub-scores and perception scores) in an attempt to determine the best set of factors that would explain the variation in total job satisfaction. Athletic directors and the associates had different perceptions of the role of the athletic director in promoting effective interpersonal relationships and of the degree of the athletic director's success. Two of the twelve job satisfaction sub-scores, those related to personal satisfaction and personal initiative, accounted for 94% of the variation in the total satisfaction score. Role perceptions and perceived success scores accounted for a very small percent of the variation in total job satisfaction when perception scores were used as the set of independent variables.

Robert A. Oliver
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April 16, 1981
3:45 p.m.

EFFECTS OF INSTRUCTION AND SUPERVISION IN INTERACTION ANALYSIS ON THE TEACHING BEHAVIOR OF SELECTED PHYSICAL EDUCATORS.

Mary E. Stevens, Klein Forest High School, Houston, TX; Victor H. Mancini and Patricia A. Frye, Ithaca College.

The purpose of this investigation was to determine the effects of instruction and supervision in interaction analysis (IA) on the teaching behaviors of elementary physical educators. The subjects, four experienced teachers, two males and two females, were randomly assigned to treatment and control groups $(n_t = n_c = 2)$. Teacher behavior was identified through the use of Cheffers' Adaptation of Flanders' Interaction Analysis System (CAFIAS). A modified case study design was employed. Each teacher was observed for 20 consecutive days, once each day while teaching an entire physical education class. The 20 classes were divided into three phases: Phase I (five classes) for baseline (pretest) data collection, Phase II (10 classes) for application of the treatment, and Phase III (five classes) for posttest data collection. During Phase II the control group received conventional supervisory feedback, while the treatment group received instruction, supervision, and feedback in CAFIAS and analysis of a CAFIAS computer printout for each lesson. Descriptive statistics were utilized to determine whether differences in teaching behavior, as identified by 17 CAFIAS variables, existed between the treatment and control groups. Pretest-to-posttest changes in teaching behavior were found for the treatment group, but no distinct changes were seen for the control group. The following conclusions were supported, each favoring the elementary physical educators who received instruction and supervision in IA:
1. They used more verbal and nonverbal praise for, acceptance of, and empathy toward students' ideas and actions; 2. They used more verbal questioning; 3. Their classes exhibited more verbal and nonverbal pupil initiated behavior, both teacher and student suggested; and 4. The nature of the teaching behavior of the treatment group changed from direct to indirect.

Mary E. Stevens
Klein Forest High School
Houston, TX

April 16, 1981
4:00 p.m.

INTERACTION BEHAVIOR PATTERNS OF MALE SECONDARY PHYSICAL EDUCATORS WITH HIGH-SKILLED AND LOW-SKILLED STUDENTS.

Brian F. Streeter, Memorial Jr. High School, Houston, TX; Victor H. Mancini and Patricia A. Frye, Ithaca College.

This study was conducted to compare the teaching interaction behavior patterns of male secondary physical educators with high-skilled and low-skilled students. Each of the 16 physical educators from central and western New York was asked to rate his students on skill ability, in order from high to low ability. From each instructor's class, 10 students, five each from the top 33% (high-skilled) and the bottom 33% (low-skilled), were randomly selected to participate, for a total of 150 student subjects. The 15 teachers were videotaped in three consecutive classes with the same students. Teacher and student behaviors were identified through the use of the Dyadic Adaptation of Cheffers' Adaptation of Flanders' Interaction Analysis System (DAC). Significant ($p < .05$) differences between the high-skilled and low-skilled groups were found through MANOVA on nine DAC variables. Stepwise discriminant function analysis revealed that over 89% of the multivariate difference was accounted for by only four variables: teacher acceptance of students' ideas and actions, teacher praise, student initiated behavior, and teacher questioning. Univariate ANOVAs showed significant ($p < .05$) differences on eight of the nine DAC variables. The results of the comparison of teaching interactions of male secondary physical educators with high-skilled and low-skilled students led to several conclusions. With the high-skilled, teachers had greater interaction, exhibited more praise and acceptance of students' ideas and actions, asked more questions, and allowed more student interpretive response and student initiated behavior. The instructor used more criticism and directions with the low-skilled students and received more predictable responses from them.

Brian F. Streeter
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April 16, 1981
4:15 p.m.

TEACHING INTERACTION PATTERNS OF SECONDARY FEMALE PHYSICAL EDUCATORS WITH HIGH-SKILLED AND LOW-SKILLED STUDENTS.

Pamela J. Reisenweaver, Humboldt State University; Victor H. Mancini and Patricia A. Frye, Ithaca College.

This investigation was conducted to determine if significant differences existed in the teaching interaction patterns of secondary female physical educators with high-skilled and with low-skilled students. Physical educators ($n=15$) from northeastern Pennsylvania and central New York served as subjects. Ten students, five rated by the teacher as high-skilled and five rated as low-skilled, were randomly selected from each class. Videotapes of all subjects were made three times throughout the 1979-1980 school year. From these, interaction patterns were obtained by an expert coder using the Dyadic Adaptation of Cheffers' Adaptation of Flanders' Interaction Analysis System (DAC). A MANOVA indicated that scores on the nine DAC teacher and student behavior categories differed significantly ($p < .05$) between the two skill groups. Stepwise discriminant function analysis revealed that over 80% of the multivariate difference was accounted for by only three variables: teacher acceptance of students' ideas and actions, teacher praise and teacher criticism. Univariate ANOVAs indicated significant ($p < .05$) group differences on all nine DAC variables. Results supported the conclusion that teaching interaction patterns of secondary female physical educators were not the same with high-skilled and with low-skilled students. High-skilled students received more praise, acceptance of their ideas and actions, information and questions from their teachers; initiated more interpretive responses; and initiated more contacts with the teachers than did low-skilled students. Low-skilled students received more directions and criticisms from their teachers and responded more predictably toward them.

Pamela J. Reisenweaver
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April 16, 1981
4:30 p.m.

STUDENT ACHIEVEMENT AND ATTITUDE IN COED CLASSES TAUGHT BY MALE TEACHERS.

Bernard Oliver, University of Texas at Austin.

The issue of sex differences in educational research has attracted considerable interest in the school community over the last decade. Much of this research has focused on student sex differences related to self-esteem, stereotypes, behavioral perceptions by teachers, interactions with teachers, intelligence and achievement, career aspirations, and preferences for selected activities and sports. However, since the advent of Title IX and the Women's Equity movement, few researchers have investigated the existence of sex-related differences in coed classrooms in motor performance, attitude, or interactions with teachers. The purpose of this study was exploratory in nature, and attempted to determine if there were differences in the attitude and motor skill achievement of boys and girls enrolled in coed activity taught by male teachers. Four hundred and two students (222 females and 180 males) were administered pretests in 3 areas: a motor skill achievement test, a knowledge test, and an attitude measure. After 6 weeks of instruction in coed volleyball, posttests were administered. The mean scores tabulated indicated that male students tended to score higher than their female counterparts on the measures employed despite having less experience in volleyball. Analysis of covariance was employed to determine if there were significant main effects for the teacher and sex of the student. The results yielded significant main effects for the teacher and sex of the student (p .05) on all measures employed. Significant interactions were found on the motor skill achievement measure and the knowledge test (p .05). These findings, like other classroom research dealing with federal mandates, provide impetus for future study of the effects of instruction on the achievement and attitude of boys and girls in Title IX settings.

Bernard Oliver
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April 16, 1981
4:45 p.m.

A STUDY OF APTITUDE BY TREATMENT INTERACTIONS ASSOCIATED WITH STUDENT DECISION MAKING IN PHYSICAL EDUCATION CLASSES, David C. Griffey, The University of Texas at Austin.

This study was conducted in an effort to resolve conflicting findings from previous research on the effectiveness of alternate teaching styles in physical education classes. Two styles of teaching, differing in the amount of choice students had in the use of class time, were examined for interactions with student characteristics. Previous studies comparing "task" and "command" instruction considered the effect of these styles on the class average performance of motor skills. This study investigated the possibility that previous, contradictory findings resulted from interactions of teaching styles with student aptitudes.

Nine physical education classes (Ss=166) were taught the volleyball skill of forearm passing with either "task" or "command" style of teaching. Initial ability, as measured with the Russell-Lange Volleyball Test, was used as a covariate in subsequent analyses of aptitude by treatment interactions (ATI).

Analysis of the main effect of teaching style was performed with ANCOVA in a non-simultaneous fashion. Analyses of ATI were conducted with a simultaneous application of the Johnson-Neyman Technique. No significant ($p<.05$) main effect for teaching style was found.

The analyses of interaction of initial ability with instructional style were conducted at two levels: overall and within-class. The overall analysis of passing scores showed regions of simultaneously significant ($p<.05$) difference for males and females. Students high in initial ability had higher posttest scores in the task treatment group. The within-class analysis showed males with high initial ranking scoring higher on the posttest in the task treatment group. No significant region of interaction was found for female ranking on forearm passing.

It was concluded that interactions of student characteristics with instructional methods can explain the different findings of prior research. The generalizability of research on the main effects of teaching style extends only to students whose characteristics are the same as those studied. The significant interactions of initial ability with instructional style found in this study all showed higher ability subjects performing better when the instruction permitted student choice in structuring class time.

David C. Griffey
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April 16, 1981
5:00 p.m.

A SURVEY OF THE NUTRITION KNOWLEDGE OF PRACTICING MALE AND FEMALE PHYSICAL EDUCATOR/COACHES.

James L. Webb, California Polytechnic State University; Andrew J. Proctor, California Polytechnic State University; Marjorie Cho, University of Hawaii.

The physical educator/coach is an influential figure in the lives of young people, educational colleagues, and the community population at large for disseminating information relating to all aspects of nutrition. The responsibility of serving as a valid resource person for these diversified populations emphasizes a need for fundamental understanding of scientifically derived nutritional facts and practices, coupled with sound knowledge in the areas of athletic training, exercise physiology and sports medicine. Since, historically, research has been bleak in its portrayal of the nutritional competency of this individual, it was the purpose of the present study to investigate three primary questions: 1) do practicing physical educator/coaches possess nutritional knowledge comparable to that displayed by college students enrolled in a university basic nutrition class? 2) do male and female physical educator/coaches exhibit similar levels of nutrition knowledge? 3) within a single group, are differences in knowledge evident when examining selected categories of information? A questionnaire/test was administered to 92 female and 49 male participants attending the 27th California Physical Education Workshop for Women in Secondary Schools and the 29th Annual California Workshop for Physical Education and Athletic Coaching, respectively. Scores were separated into seven categories of inquiry and comparisons made by chi-square analysis, both between sexes and against values obtained from students enrolled in a university nutrition class. Within group variability of knowledge was also assessed for the three groups. Findings revealed that the nutrition class scored significantly ($P < .05$) higher in all areas surveyed and showed no within group variations in knowledge. Conversely, with the exception of information relating to "water/electrolyte information" and "miscellaneous nutrition information," no significant differences were found between knowledge scores of male and female physical educator/coaches. However, both coaching groups showed significant variability in knowledge from category to category. Results support the need for formal training in nutrition science for these professionals.

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April 16, 1981
5:15 p.m.

A THEORY OF PRESCRIBED ACADEMIC CHANGE. Judith Patten Newcombe, Virginia Commonwealth University.

This study was directed toward the discovery of a grounded theory that identifies the conditions and processes which facilitate effective implementation of federal mandates in institutions of higher education. The constant comparative method, an inductive approach to generating theory, was used to study the implementation of Title IX of the Higher Education Amendments of 1972 and the accompanying regulations and policy interpretations for elimination of sex discrimination in athletics. The research population included public colleges and universities in Virginia. From this population, a sample of four comparison groups (institutions) was selected through application of a mathematical formula which defined each institution in terms of a numerical Change Index. The Change Index formula measured the degree of progress toward Title IX compliance in athletics at each institution over a five year period, 1974-79. In-depth investigations at each of the four colleges focused on the discovery, development and verification of theory. Open-ended interviews were used to guide data collection and analysis throughout the investigative process. The theory of prescribed academic change, which expands on existing models of educational change, views implementation of federal mandates as occurring through both planned and unplanned processes. In brief, implementation of mandated change occurs in four consecutive stages; and the rate and degree of institutional progress through the stages are dependent upon four major categories of variables. A complex and multi-directional set of relationships exists between stages and categories and among the variables within each category. When the combination and influence of identifiable variables within an institution facilitate progress through the four stages of implementation, a mandate will be implemented effectively. The conclusions regarding the means by which administrative leaders exert power to influence institutional response to a mandate, the description and explanation of the change process in terms of institutional sub-structures and sub-systems, and the role of organizational politics are unique to the theory. Further, the identification of intervention as a precipitant to the effective implementation of prescribed change is critical in explaining why mandates are implemented effectively in some institutions and not in others.

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April 16, 1981
5:30 p.m.

LONGITUDINAL TRAINING RESPONSES OF COMPETITIVE SPEED SKATERS.

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Nine competitive speed skaters (7 male, 2 female) were studied during training for the 1980 Olympic trials. Measures of pulmonary function, body composition and the response to graded treadmill exercise were made at the beginning and end of intense dry land training in June (T1) and October (T2) and immediately following the Olympic trials in December (T3) 1979. Before T1, training was bicycling or running (1 hour/day). From T1 to T2 training was twice daily (20 hours/week) including bicycling, running, weight lifting and skating drills. From T2 to T3 training was twice daily skating plus a reduced schedule of dry land drills. The skaters were divided into successful (S) (N=5) and unsuccessful (U) (N=4) subgroups on the basis of being selected to represent the U.S. in international competition. There was a significant decrease from T1 to T3 in forced expiratory volume for one second (FEV 1.0), but not in forced vital capacity. The decrease in FEV 1.0 was significantly greater in U, particularly between T1 and T2. Body weight and lean body weight increased from T1 to T3 for all subjects. S lost fat from T1 to T3 whereas U tended to gain fat between T2 and T3. This is potentially attributable to difficulty in maintaining optimal diet and exercise patterns in the presence of lifestyle disturbances resulting from moving to Europe for training between T2 and T3. It also reflects the significant differences between S and U for age and skating experience. Thigh girth was larger for S but increased equally for both groups. The increase in thigh girth was greater during the more specific training done on ice bwtween T2 and T3. Maximal oxygen uptake ($\dot{V}O_2$ max) and treadmill performance declined in both groups from T1 to T3. Anaerobic threshold expressed as either an absolute value or relative to $\dot{V}O_2$ max, did not differ between groups or with trials. It was concluded that fatigue associated with severe training or recent competition was reflected by significant decreases in FEV 1.0, $\dot{V}O_2$ max, and treadmill performance. Positive responses to training were reflected by increases in lean body weight and the maintenance of a low fat percentage, the latter factor clearly differentiating S and U. The data imply that the use of treadmill running to evaluate speed skaters is not sufficiently specific to reflect increases in fitness attributable to training.

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April 17, 1981
8:30 a.m.

PSYCHOPHYSIOLOGICAL ASSESSMENT OF THE 1980 UNITED STATES OLYMPIC FREESTYLE AND GRECO ROMAN WRESTLING CANDIDATES. John M. Silva,III and Barry B. Shultz, State University of New York-Brockport; Robert W. Haslam, Syracuse University; Thomas P. Martin, Wittenberg University; Donald F. Murray, State University of New York-Brockport.

The purpose of the present study was to extend a psychophysiological model for elite wrestlers to include motoric factors and continue the process of identifying variables which discriminate between qualifying and nonqualifying athletes during elite competition. The hypothesized model developed in this study was used to isolate variables that relate to success in both Greco Roman and Freestyle elite wrestlers. The subjects were 86 olympic candidates who were invited to participate in the 1980 United State Greco Roman and Freestyle Olympic Wrestling Trials. Athlete performance was determined by a wrestle-off format which permitted the athletes to be rank-ordered within their weight class. Psychological testing included both state and trait measures. State measures were administered the night prior to the first round of wrestle-offs. Trait measures were obtained during the athletes' stay at the camp. Athletes were also evaluated on anthropometric, physiological, and motoric variables. Descriptive data analyses indicated significant univariate differences ($p < .10$) in the profiles of qualifiers and nonqualifiers. The results indicated that the qualifiers were less depressed, less guilty, lower in state, trait and covert anxiety, lower in maximal heart rates, and possessed greater ventilatory minute volumes. Measurements were taken on 52 variables and a hypothesized model based on previous empirical evidence was constructed a priori. The resultant 32 variable model significantly discriminated qualifiers and nonqualifiers by generating a 15 variable model which had a multiple R of .84. The order of the five most discriminating variables was: ventilatory minute volumes, surgency trait, guilt state, stress state, and right grip strength. The discriminant function which was generated resulted in 91% of the athletes being correctly classified.

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April 17, 1981
8:45 a.m.

BODY COMPOSITION AND PHYSICAL DIMENSIONS OF YOUNG, EXPERIENCED WRESTLERS.

Wade Hoyt Thomson, Stan Sady, Mark Savage, Marlene Petratis, University of Nebraska at Omaha.

Body composition and physical dimensions were compared in young, experienced wrestlers (W, $\bar{x}$ age ± SE = 11.2 ± 0.24 years, N=23). The W were the best wrestlers from local wrestling clubs and averaged (± SE) 2.7 (± 0.27) years experience. They had won 72% (± 1.8%) of the total 75 (± 9.1) matches. Additionally, more than half were the top 3 placers in city and/or state meets and 6 had won an international meet. The S were from local elementary schools and were considered typical in the variables measured to similar groups of children from the literature. Standard densitometric and anthropometric techniques were used to measure the body compositions (% fat from Siri formula) and physical dimensions of each group. Residual lung volume was determined by the O_2 dilution technique. The W were 4 kg (± 1.9) lighter ($p<.05$) and had a smaller % body fat than S (W, $\bar{x}$ ± SE = 13.3 ± 0.66% and S, $\bar{x}$ ± SE = 20.0 ± 1.13%, $p<.05$). The % body fat of W is more than 2X the minimal value proposed by the American College of Sports Medicine for high school and college wrestlers. The lower fat of W was reflected in smaller skinfolds (log transformation) and lower-body circumferences. No differences (p .05) were found between groups in diameters (except by bitrochanteric), most upper-body circumferences, height, or lean weight. It was concluded that wrestlers have lower body fat but similar skeletal structure when compared with typical children. The data suggest a need for separate standards for minimal wrestling weights of young children.

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April 17, 1981
9:00 a.m.

A COMPARISON OF PHYSIOLOGICAL CHARACTERISTICS OF FORWARDS AND BACKS IN WOMEN'S COLLEGIATE RUGBY.

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The nature of the sport of rugby is such that there are basically two types of positions, forwards and backs. Physiological prerequisites for participation in the sport include strength, speed, agility, anaerobic power, and aerobic power. There is no literature to date which quantifies the above-mentioned variables for collegiate women ruggers. The purpose of this study was to compare selected physiological variables of forwards and backs of a regionally ranked women's rugby club. Ss were 19 volunteers from the Southern Illinois University Women's Rugby Team. Mean values for age (yrs), height (cm), and weight (kg) were 20.6 (±2.5), 165.1 (±5.2), and 64.7 (±11.4), respectively. Ss were tested on the following variables: the sum of four skinfolds (SF), biceps, triceps, sub-scapular and suprailiac, percentage of body fat (PF) as determined by hydrostatic weighing, biceps strength (BS), quadriceps strength (QS), grip strength (GS), agility (AG), anaerobic power (ANP), aerobic power (AP), and lactic acid production (LA). A t-test for independent samples was utilized for all comparisons, with a predetermined level of significance set at $t \geq 1.740$, $p \leq .05$. The results of the t-tests for the anthropometric variables indicated that the forwards were significantly heavier ($t=3.23$), had a significantly greater PF ($t=3.08$), and had a significantly larger sum of SF ($t=4.17$) than the backs. The backs performed significantly faster in the agility run ($t=1.88$). No significant differences were found in BS ($t=1.08$), QS ($t=0.33$), and GS ($t=0.62$), however, the forwards had significantly greater ANP ($t=1.76$). Maximal oxygen consumption measured during a treadmill test indicated that the forwards had significantly greater absolute AP ($t=2.49$), however, when expressed relative to body weight, no significant difference ($t=-1.30$) was found. Post exercise LA values between forwards and backs were not significantly different ($t=0.91$). It was concluded from this study that there are certain physiological attributes characteristic of the two types of rugby positions. The forwards, whose primary purpose is to work as a forceful unit to win the ball, are generally heavier and more powerful. The backs, who run the ball downfield in an attempt to score tries, are lighter, faster, and more agile.

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April 17, 1981
9:15 a.m.

SOMATOTYPE AND SELECTED PHYSICAL CHARACTERISTICS OF INTERCOLLEGIATE SAILORS.

George K. Wood, College of Charleston; Peter McGrain, Texas Women's University.

During the summer of 1980, the authors were given the opportunity to take anthropometric measures on sailors participating in the North American dinghy and team race championships at the sailing site in Boston, Mass. The purpose of the study was to determine anthropometric somatotypes of the 37 women and 67 men and to present in descriptive format the data collected. The sample represents many of the top intercollegiate sailors at the time the data were collected including 22 of the 30 All-America sailors selected that year. Anthropometric data collected included height, weight, femur width, humerus width, biceps and calf girth. Skinfold measures taken included triceps, subscapular, suprailiac, calf, thigh and umbilicus. All data were collected using the methods and instruments described by Carter. Age was determined on each subject. Each subject was classified as a skipper or a crew according to the position sailed in the event. Anthropometric somatotypes were determined using the procedures described by Heath and Carter. A skinfold sum for the six sites listed was determined. Mean somatotype for all men and women measured were 2.81-4.97-2.68 (mesomorphic) and 4.01-3.51-2.54 (endomorphic mesomorphic). Mean height and weight for all men were 174.28 kg. and 68.38 cm. Mean height and weight for all women were 161.30 kg. and 54.84 cm. Mean skinfold sums for all males and females measures were 64.48 mm. and 93.04 mm respectively. For the All-America sailors, mean somatotype was 2.75-5.54-2.42 (mesomorphic), mean height and weight 173.77 kg and 69.63 cm., and mean skinfold sum was 63.37 mm. Somatotypes and physical characteristics for a variety of athletic participants have been reported in the literature. Analysis of descriptive data reported indicates particular mean data for that sport. The results of this study indicate that collegiate sailors exhibit a small statue, in terms of the selected anthropometric measures taken. While somatotypes for both sexes indicate a predominance of mesomorphy, somatotypes were not confined to a particular area of the somatochart, indicating some variability. This was particularly true of the women measures. The data indicated that the All-America sailors measured were only slightly more mesomorphic, lighter in weight, taller, and leaner than the mean for the other males measured.

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April 17, 1981
9:30 a.m.

CHARACTERISTICS OF NATIONAL CLASS RACE WALKERS.* Barry A. Franklin; Thomas W. Moir; Krishna P. Kaimal; and Herman K. Hellerstein, School of Medicine, Case Western Reserve University, Cleveland, Ohio.

The purpose of the study was to investigate the physiologic and psychologic characteristics of highly trained race walkers, and to compare these results with those noted for distance runners. Nine national caliber race walkers were assessed for body composition, maximal aerobic capacity ($\dot{V}O_2$ max), blood chemistry, pulmonary function, and personality profile (Minnesota Multiphasic Personality Inventory, MMPI). Training (walking) mileage ranged from 45 to 110 miles per week, mean 73.9. Mean ± SD age, height, weight, percent body fat, resting heart rate, and $\dot{V}O_2$ max were 26.7 ± 8.0 years, 178.7 ± 7.6 cm., 68.5 ± 6.0 kg, 7.8 ± 2.5% body fat, 54.1 ± 6.4 beats · min^{-1}, and 62.9 ± 4.1 ml·kg^{-1} min^{-1}. Relative hemoglobin and hematocrit values were at the lower limits of normal, 14.5 gm/dl and 41.4% respectively. The mean total cholesterol, triglyceride, and HDL-cholesterol levels were 169, 85, 56 mg/kl respectively. The total cholesterol/HDL-cholesterol ratio was remarkably low, 3.0. Pulmonary function studies, including vital capacity, forced expiratory volume in 1.0 sec, and maximal voluntary ventilation were within the normal range for untrained men of comparable age and size. MMPE personality and validity scales, expressed as mean T scores, were within normal limits. With the exception of a slightly lower aerobic capacity, the physiologic and psychologic profile of the race walker is quite similar to that of the marathon runner. Perhaps the technique and efficiency of race walking are more important to successful performance than is a great aerobic capacity.

*Supported in part by a grant from Blue Cross of Northeast Ohio.

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April 17, 1981
9:45 a.m.

HIGH SCHOOL CROSS COUNTRY RUNNERS: A PHYSIOLOGICAL PROFILE OF A STATE CHAMPIONSHIP TEAM.

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We tested six high school cross country runners (17.0 ± .8 years) who were members of the team which won the Massachusetts state high school championship in 1979. Mean anthropometric values found this team to be shorter (65.8 ± 3.1 in.), lighter (116 ± 21 lbs.) and less fat (7.4 ± 1.8%) when compared to age related norms. The mean somatotype, 2.0-3.9-4.2, estimated by the Heath-Carter rating form was considered more ectomorphic and less mesomorphic than elite endurance athletes. Mean plantar flexion strength obtained by using an Orthotron (Lumex, Inc.) was 88 ft.-lbs. of torque. The blood chemistry data in mg/kl were: T-Chol = 160.3 ± 23.6; TG = 54.8 ± 24.9; HDL-C = 49.0 ± 7.4; LDL-C = 100.1 ± 20.9 and glucose = 81.8 ± 19.2. Maximal respiratory responses were obtained by using a Monark Bicycle Ergometer and a Beckman Metabolic Measurement Cart. Mean maximal values were: $\dot{V}O_2$ (ml/kg/min.) = 57.4 ± 2.1; $\dot{V}_E$ (L/min.) = 109.7 ± 23.4 and RQ = 1.14 ± .7. The anaerobic threshold was estimated at 85.9% of the $\dot{V}O_2$ max. Mean resting and maximal heart rates were 50.8 ± 9.0 and 189.4 ± 7.6 bpm respectively. Resting and exercise hyperemic pulsatile arterial blood flows were measured at the calf using a noninvasive electromagnetic flowmeter (Doll Medical Research, Inc.). The flowmeter data suggested greater vessel elasticity, smaller minute flow values, increases vascular conductance, increased mean transit time through the peripheral terminations and an increased perfusion pressure when compared to other data from this Laboratory using male adults, age 18 to 30 years. We conclude: a) members of a championship cross country team exhibit a physiological profile which is characteristic of endurance athletes, b) team members show little inter-individual variation, c) no adverse effects of season-long training were noted, and d) several well known cardiovascular risk factors were considered low normal in this group.

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April 17, 1981
10:00 a.m.

BIOLOGICAL DETERMINANTS OF DISTANCE RUNNING PERFORMANCE: EVALUATION OF A MODEL.

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The purpose of this study was to organize and integrate information related to the biological determinants of distance running performance into a model that accounts for the functional relationships among variables. The selection of the following independent variables used in the multiple regression/correlation analysis was dictated by known associations among the variables and the mechanisms by which they influence distance running: cardiorespiratory capacity ($\dot{V}O_2max$ in ml/min·kg FFW), % body fat, anaerobic threshold (% $\dot{V}O_2max$), and running efficiency ($\dot{V}O_2$ in ml/min·kg BW at 188 m/min). Subjects were 68 moderately-trained runners, 34 males and 34 females, 19 through 35 years of age. To insure that the male and female data could be legitimately combined into a single group for analysis, the slopes from the equations predicting 12-min run distance for each of the biological variables within the groups of males and females were statistically tested. No significant differences were found indicating that the expected effect of a change in each of the independent variables on 12-min run distance was similar for both sexes. The correlations among the four biological variables were low or nonsignificant ($r \leq .34$) supporting the contention that to a large degree each variable functions independently. Three out of the four hypothesized variables were found to significantly improve prediction of the 12-min run field test ($R = .92$). Whether considered singly or in combination with other predictors, anaerobic threshold was not related to distance running performance. This finding may in part be attributed to limitations in the method of measurement and/or the statistical approach. Results of this study indicate that among a group of trained adult runners, distance running can be predicted with a relatively high degree of accuracy from laboratory measures of cardiorespiratory capacity, % body fat, and running efficiency. To further evaluate the proposed model, additional systematic testing is necessary, especially cross-validation in larger and more heterogeneous samples.

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April 17, 1981
10:15 a.m.

THE DEVELOPMENT AND EVALUATION OF A MENTAL HEALTH COURSE AND ITS RELATIONSHIP TO CHANGES IN SELF-CONCEPT, AUTONOMY, AND SELF-ACTUALIZATION.

Herrick Hawkins, Northeastern University.

The purposes of this study were to develop a high school mental health course and to determine the effectiveness of the course on facilitating mental health as measured by changes in autonomy, self-concept, and self-actualization. Seven high school groups were involved in the study. The participants were pretested in the fall and posttested after the three experimental groups participated in the 105 class period mental health course. The measure of mental health was the Personal Orientation Inventory. From the results of the study, the following conclusions are made: (1) Participants in the mental health course showed a significant posttest improvement in their levels of autonomy, self-concept, and self-actualization than students who did not participate in the mental health course. (2) Students who participated in a standard health course with a different content but a similar classroom environment as the mental health course scored higher on the three posttest measures than the control groups. However, they did not score as high as the participants in the mental health course. These results suggest that there were specific variables of the classroom environment in addition to the content that facilitated improved levels of autonomy, self-concept, and self-actualization. (3) The specific variables that made up the content and the classroom environment of the mental health course may have contributed to the positive changes in mental health. These include: increased psychosocial awareness, the willingness and ability to self-disclose; increased ability to communicate effectively, make decisions, and solve personal and interpersonal problems; a realistic and accurate view of self; and a classroom environment that was characterized by congruence, unconditional positive regard, an empathic understanding, the facilitator as a learner and model, trust, and the use of the small-group format. Based on these findings, it is suggested that these variables and classroom environment may be used in educational programs to facilitate optimal mental health.

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April 17, 1981
8:30 a.m.

ROLE OF HEALTH BELIEFS AND SOCIAL PSYCHOLOGICAL PERCEPTIONS IN ADOLESCENT SMOKING DECISIONS.

Allen H. Henderson, Texas Wesleyan College and Elbert D. Glover, Texas Christian University.

Smoking decisions are often assumed to be primarily a function of health beliefs. A multivariate model of adolescent smoking decisions was examined in order to assess the role of health beliefs versus social perceptions and demographic factors. Utilizing a technique which increases the validity of self-reports, an indepth survey of 431 ninth graders was undertaken. Females reported more overall exposure to cigarette smoking $(F(1,416) = 5.29; p = .02)$ and a greater likelihood of having a steady who smokes $(X^2(4)=16.89; p=.002)$ than males. Smokers reported being exposed to others who smoke significantly more than nonsmokers $(F(1,416) = 174.56; p = .001)$. Evaluation of the model predicting present smoking decisions indicated that exposure to smoking by others $(F(10,339) = 36.05; p < .001)$ accounted for 45% of the variance while the normative expectation of others $(F(2,339) = 13.99; p=.001)$ and health beliefs $(F(1,339) = 17.20; p = .001)$ accounted for 3.5% and 2.1% of the variance respectfully. In contrast, the model predicting future smoking intentions, controlling for present smoking behavior, resulted in health beliefs $(F(1,338) = 30.45; p = .001)$ accounting for 4.5% of the variance followed by 3.2% by traditional demographic measures $(F(11,338) = 1.97; p = .05)$, 2.2% by perceived social pressure to smoke $(F(1,338)=14.86; p = .001)$ and 1.5% by expectations of others $(F(2,338) = 4.82; p = .01)$. Social-psychological perceptions were found to be material to both present and future smoking decision, although exposure to smoking models was most predictive of present behavior. Important differences were found between smokers and nonsmokers as well as males and females. Implications for future prevention programs are discussed.

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April 17, 1981
8:45 a.m.

STRESS, ILLNESS, AND PERSONALITY BEHAVIORAL PATTERNS IN COLLEGE STUDENTS, Rose Lynn Daniels, The William Paterson College of New Jersey, Wayne, N.J.

The specific objectives of this study were: 1) to develop a Life Change Unit Rating Scale for College Students (LCURSCS), 2) to develop a predictive index of near future illness based on subject's stress score, and 3) to assess the mediating influence of personality behavioral pattern on the stress-illness relationship. The life change events in the LCURSCS were generated from traditional college students and two scales previously developed for use with this population. Analyses of variance showed no significant differences for mean ratings assigned to the events for the variables of age, sex, class standing, or frequency of event experience. Spearman rank correlation coefficients for items in the LCURSCS with identical items in the two existing scales were .84 and .81 at the 0.001 level of significance. Subjects (N=457) completed the LCURSCS, an illness inventory, and two personality behavior inventories. Illness symptomotology was assessed and the following risks of illness based on stress scores were computed: minor stress = 0-1500 (28% chance), mild stress = 1501-3500 (45% chance), moderate stress = 3501-5500 (70% chance), and major stress = 5501 + (82% chance). Computed means for the four measures indicated a direct relationship among the measures. When means and Pearson Product-Moment correlations were calculated based on the intensities of the behavioral pattern score of the subjects, the general hypothesis of the study was upheld; high stress/low illness students exhibited the Type A behavior pattern and low stress/high illness students exhibited the Type B behavior pattern.

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April 17, 1981
9:00 a.m.

THE RELATIONSHIP OF SEX-ROLE ORIENTATION TO SELF-PERCEIVED HEALTH STATUS IN A SAMPLE OF MIDDLE-AGED MALES.

Ann M. Downey, Northeastern University.

The increasing disparity in the longevity statistics between males and females must be examined from a perspective of life-styles, and specifically from the stance of how the societal male sex-role stereotype has affected the health and well-being of the American male. The purpose of this study was to determine how sex-role orientation was related to self-perceived health status among a group of middle-aged males. A nonprobability sample of 237 male volunteers between the ages of 40 and 59 years was obtained from various institutions and organizations in the Baltimore - Washington metropolitan area. The 237 male participants of which 88.7% were engaged in professional occupations completed a questionnaire made up of various research instruments. The Bem Sex-Role Inventory was used to measure sex-role orientation, while two separate measures were employed to assess self-perceived health status. Specifically, a composite variable score for health status was generated via a principal-components analysis from items that were qualitative in nature, tapping subjective levels of health. The Bradburn Affect Balance Scale which measures psychological well-being was utilized as the second assessment of self-perceived health. Planned comparisons were performed on the data to test the hypothesis that the middle-aged males with a traditional male sex-role orientation would report lower self-perceived levels of health than would those males with an androgynous sex-role orientation. The results revealed significant differences on each of the two measures employed in the assessment of self-perceived health status. On the composite variable score for health status, the men with a traditional male sex-role orientation reported lower self-perceived levels of health than did those males with an androgynous orientation, as was predicted. Similarly, on the Bradburn Scale, the males with a traditional orientation or those classified in the masculine group revealed lower scores which was reflective of less positive psychological well-being than did those men considered to be androgynous. Results of this study suggest that in a sample of professional middle-aged males, an androgynous sex-role orientation was associated with higher levels of self-perceived health than was a traditional male sex-role orientation. Further testing of the relationship between these two variables is recommended in a representative sample of middle-aged males.

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April 17. 1981
9:15 a.m.

AN EPIDEMIOLOGICAL AND ATTITUDINAL ANALYSIS OF RAPE AND OTHER SEXUAL ASSAULT AMONG URBAN FEMALE HOSPITAL PERSONNEL.

Charles Rinear, Philadelphia, PA, Richard St. Pierre and Robert Shute, The Pennsylvania State University.

The study characterized the experiences of reported and unreported sexual assault among a definable female population. It also determined the association of selected intervening variables with attitudes and anticipated reactive behavior concerning sexual assault. A subproblem of the study was the development of an instrument for characterizing assault experiences and for measuring attitudes and anticipated reactions to the threat of rape. The sample consisted of 6,807 female employees of eight metropolitan hospitals. 2,329 (34.2%) returned the completed questionnaire. Respondents provided the following information with respect to sexual assault: risk exposure, anxiety or apathy, anticipated aggressive or passive reactions to assault, and anticipated post-assault reporting behavior. Subjects having experienced reported or unreported sexual assault during their lives completed the remainder of the questionnaire, the Sexual Assault Inventory. Its purpose was to ascertain the prevalence of a variety of background and situational factors which may predispose a woman toward sexual assault but also toward the likelihood of reporting the event to friends, relatives, and/or the police. Patterns of emotional reaction to this experience were examined. Findings indicated that sexual assualt was not infrequent; further a considerable number had been victimized by indecent exposure during their lives but the experience did not register emotionally as a sexual assault. Although women expressed intentions of resisting sexual assault, few were trained in self-defense. Struggling and running represented an effective form of resistance while pleading did not. The majority of the victims' assailants were not apprehended by the police; the majority of offenders tried for assault were not convicted. Most sexual assaults and episodes of indecent exposure identified in this investigation were not reported to police. Characteristics surrounding reported and unreported sexual assaults differed in regard to offender-victim relationship, assault scenario, and post-assault effects upon victim's life. Completed and unsuccessfully attempted sexual assaults differed with regard to the assault scenario and post-assault outcomes. Assault-related variables were found to interact with whether an assault was completed in determining whether an assault was reported to the police. Anticipated reactive behavior regarding assault were related to background variables, current risk of exposure, and victimization experience.

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April 17, 1981
9:30 a.m.

POST-ABORTION STUDY. Marti J. Sopher, Midwest Medical Center, Madison, Wisconsin.

The purposes of this study were to evaluate goals and objectives of the clinic; to give direction to programming; to evaluate patient well-being (physical,social,emotional) and knowledge, attitudes,and behaviors; and to make use of local data in public relations with referrals and legislators, community education, patient education (health consumers), staff inservice, and clinic remodeling. Its importance lies in the fact that MMC is largest of state abortion providers, because unplanned pregnancy is currently a health "problem" for women of all ages, and because more education is needed in this area. A 20-question followup form was given to every patient on the day of her procedure, by her counselor or nurse with an explanation and request to return it in person or by mail. Confidentiality was stressed. Results: 3/4 experienced discomfort/pain at level expected or less than expected. 1/2 experienced cramping similar or less than normal menstrual cramping. 11% experienced more bleeding than a normal menstrul period. 3% experienced fever. 5 were hospitalized for reasons related to abortion. 62% received post-abortion checkups within 2-4 weeks after the procedure. 18% returned to MMC for followup care. Before abortion, 70% did not use any contraception. Following the abortion, 78% used a method (60% pill; 20% diaphragm; 8% condoms; 3% IUD). Birth control information received was adequate. 94% decided on abortion before arriving at the clinic for counseling. 76% cited satisfaction with the decision to have an abortion. Only 1% expressed regret. 40% felt no effects or changes in their life or relationships due to abortion. 36% felt a postive effect. 15% felt a change, were hurt, or the relationship ended. 2% never told the partner. 80% cited relief after the abortion; 1% guilt; 2% worry; 4% depression; and 4% sense of loss. 77% talked with someone else about their feelings post-abortion. Only 3% found counseling uncomfortable, not helpful or not useful. 99% felt the procedure was clearly explained. If abortion was not available as an alternative, 44% would have the baby; 13% adoption; 10% marriage; 7% abortion by any means necessary; 6% cited suffering or desperate acts. 4% needed a private physician; 3% needed further counseling; and 1/4 wanted information on how to keep abortion safe and legal. The data collected from 966 patients provided evaluation of clinic programming; set new goals and objectives; evaluated the whole patient post-abortion; aided referrals and legislators; patient education, staff education, community education, and remodeling.

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April 17, 1981
9:45 a.m.

SELF-ACTUALIZATION AND THE EUSTRESS CONCEPT.

Richard Petosa, University of Nebraska at Lincoln.

While research in the stress field has demonstrated significant relationships between mounting stressful life events and the onset of psychological distress symptoms, there have been studies reported that do not support the stress-illness hypothesis. While many factors may be responsible for some of the inconsistencies found in the literature the possibility exists that psychosocial stressors may also have positive effects upon the individual's psychological state. To overcome the common misunderstanding of stress as an entirely negative concept Selye makes the distinction between "distress" and "eustress", eustress being the stress of successful adaptation that is beneficial or growth promoting for the organism. The present study addresses Selye's theoretical formulations of eustress. Using a measure of self-actualization as a criterion of psychological wellness and stressful life events as the potential stressors, several issues were studied. First, this study attempted to determine if self-actualization is associated with optimal levels of stressful life events experience. Secondly, each subject's subjective appraisal of the stressful life events he experienced was considered to determine if the subject's interpretation of the event influenced scores on the measure of self-actualization. Finally, the personality characteristics of rationality and sensation seeking motive and the environmental factor of social support were considered to determine if they serve as mediators of stressful life events. The results of this study indicated that individual appraisal of stressful life events experience as positive or negative was systematically associated with measured levels of self-actualization. The mediating factors of rationality, sensation seeking motive and social support were found to be relatively powerful predictors of self-actualization scores but failed to have the expected mediating effect upon stressful life event experience. The results of this study suggest that personal appraisal of stressful life events experience may be an important factor when assessing the impact of stress upon positive dimensions of mental health.

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April 17, 1981
10:00 a.m.

RECIDIVISM RATE AMONG SCHOOL-AGE CHILDREN IN A DRUG EDUCATION PROGRAM. Lawrence W. Cappel, California State College, San Bernardino.

This paper is the result of an investigation of recidivism rates among teenaged children who completed a program designed to improve communication between the children and their parents. A sample of 62 children ranging in age from 13 to 18 years was utilized. All members of the sample were children who had been referred to a mental health program by juvenile courts for therapeutic intervention because of drug offenses. The intervention program stressed family communication and communication techniques and required the attendance of both the child and parents. Three types of rates of recidivism were then obtained from juvenile court records for each sample member. These included all referrals, adjusted referrals (excluding such referrals for truancy, fighting, traffic offenses, etc.) and those referrals for drug offenses only. These were analyzed for both pre- and post-intervention length of time. Analysis of data revealed significant ($p < .001$) decrease for all three categories of referral. Notable was that the recidivism rate for drug offenses was the rate with the most significant decline. While this data is encouraging there are some considerations necessary. The first is the fact that the degree of experimental control was limited. The use of a control group would perhaps have been beneficial. Secondly, one must consider the effect of the "arrest experience" and its relationship to learning how to avoid getting caught for the same offense a second time. This could be examined further if the pre- and post-intervention periods could be lengthened. A final consideration would be the effect of other intervention programs on recidivism. Many of the children were receiving more than one type of therapy. The question of which intervention program had the most effect on decline of recidivism would have to be answered before one could accept the conclusion that the communication program was indeed responsible for the significant decrease in recidivism.

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April 17. 1981
10:15 a.m.

AEROBIC CAPACITY, STRENGTH AND POWER DIFFERENCES BETWEEN MALE AND FEMALE ATHLETES. Emily Haymes, Arthur Dickinson, Emerson Garcia and Guy Thibodeau, University of Colorado, Boulder.

Theoretically male and female athletes who receive equal training should be equal in aerobic capacity, strength and power when adjustments are made for differences in lean body weight. Title IX provides the female collegiate athlete with the opportunity to train equally with her male counterpart. The purpose of the present study was to examine the differences in aerobic capacity, strength and power relative to weight and lean body weight between male and female collegiate athletes. Forty-one male and 37 female alpine skiers, cross-country skiers, and middle-distance and distance runners at the University of Colorado served as subjects. Measurements included skinfold thicknesses, $\dot{V}O_2$max (treadmill), isometric knee extension strength, Margaria Kalamen stair run and the vertical jump. Female athletes had twice the percent body fat and 71% as much lean body weight as the males. Differences in $\dot{V}O_2$max/kg between males and females ranged from 15.6% for the alpine skiers to 22.9% for the cross country skiers. The difference in $\dot{V}O_2$max/kg LBW between the males and females was 2% and not significant. There were no significant differences in leg strength/weight and strength/kg LBW ratios between the male and female athletes. Power as measured by the Margaria-Kalamen stair run was significantly smaller per kg LBW for the female athletes compared to the males in each of the sports. However, the power/kg LBW of the female alpine skiers was equal to that of the male cross-country skiers and middle-distance and distance runners. Vertical jump/kg LBW was also significantly larger for the male athletes. One possible explanation for the greater power of the male compared to the female could be the larger diameter fast twitch muscle fibers found in the male. It was concluded that training has reduced the differences in aerobic capacity and strength but not power to the point where they can be explained by the differences in lean body weight between males and females.

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April 17, 1981
10:45 a.m.

PHYSICAL FITNESS PROFILE OF COLLEGE FRESHMEN.

Gary S. Pechar; C. Douglas Clinger; Francis J. Brannon; C. Joseph Russell, Slippery Rock State College

The purpose of this study was to construct a physical fitness profile of entering students at Slippery Rock State College of Pennsylvania. A total sample of 166 males and 195 females was randomly selected and tested during the freshmen orientation sessions of 1979 and 1980. Five components of fitness were evaluated: CR endurance, muscular strength, muscular endurance, flexibility and body composition. CR endurance was predicted by means of the Astrand-Rhyming step test as modified by Sharkey, muscular strength by maximum grip dynamometer score, muscular endurance by means of a two-minute sit-up test, flexibility by a sit-and-reach and pectoral wand test and percent body fat was predicted from the population specific Katch/McArdle regression equations utilizing three circumference measurements. The mean 15-second recovery pulse count from the Astrand-Rhyming step test was 30.5 and 34.5 beats for men and women respectively. Based upon these recovery heart rates predicted Max Vo_2 values were 51.3 ml/kg.min for men and 42.2 ml/kg.min for women. Mean maximum grip strength scores were 48.5kg for men and 27.5kg for women. The average number of sit-ups completed in two-minutes was 68 for men and 50 for women. The mean percent body fat was 13.9% and 22.4% for males and females respectively. Mean sit-and-reach flexibility was 40.92cm for men and 42.33cm for women and mean pectoral flexibility was 29.06cm and 37.16cm for men and women respectively. The results appear to indicate that the fitness profile of freshmen at Slippery Rock State College is above average in CR endurance and average in body composition, muscular strength, muscular endurance and flexibility.

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April 17, 1981
11:00 a.m.

DETERMINANTS OF RELATIVE ENDURANCE PERFORMANCE IN CHILDREN AND ADULTS. Stan Sady, University of Nebraska at Omaha; Victor Katch, John Villanacci, Patty Freedson, Robert J. Moffatt, University of Michigan.

The physical and physiological determinants of relative endurance performance on the bicycle ergometer were examined in prepubescent boys ($\bar{x}$ age ± SD = 10.1 ± 1.33 years, N=19) and adult men ($\bar{x}$ age ± SD = 29.- ± 5.77 years, N=20). Relative endurance was defined as the cumulative pedal revolutions (CUMREV) turned during an 8 minute exercise test in which all subjects began pedalling at a supramaximal workload (children 103% $\dot{V}O_2$ max and adults 105% $\dot{V}O_2$ max, $p < .05$). This model has been previously shown to adults in adequate score reliability for both children (r=.84) and adults (r=.82). Body composition and physical dimensions were determined by standard densitometric and anthropometric techniques. Standard open circuit spirometric techniques were used to determine $\dot{V}O_2$ max during an incremental bicycle exercise test. The onset of metabolic acidosis ($\dot{V}O_2$-MA) was obtained using gas exchange variables ($\dot{V}E_{BTPS}$, $\dot{V}CO_2$, FEO_2) from the third minute of each workload on the $\dot{V}O_2$ max test. CUMREV correlated poorly (r=.24) with age, body composition and physical dimensions, $\dot{V}O_2$ max and $\dot{V}O_2$-MA for children. For adults, on the other hand, moderate correlations (r=.44) were found between CUMREV and height, weight, lean body weight, leg length, and $\dot{V}O_2$-MA. Stepwise multiple regression analysis indicated that fat weight, $\dot{V}O_2$ max (ml/gk/min), height, leg length and weight accounted for only 54% (SE=7.2% of $\bar{x}$) of total variance in CUMREV. Apparently, the relative endurance model measures a highly specialized type of work performance not entirely determined by these physical and physiological factors. These data suggest different determining factors for relative endurance in children and adults.

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April 17, 1981
11:15 a.m.

THE PHYSICAL FITNESS AND LIFE SATISFACTION OF WOMEN OVER 60 YEARS OF AGE. Dorothy M. Coertzen, Robert C. Serfass, George Sopko, and Arthur S. Leon. Division of Physical Education and Laboratory of Physiological Hygiene, University of Minnesota.

The primary purposes of this study were to compare the fitness level, physical activity level, and life satisfacitons of two groups of elderly women. Subproblems were to investigate the effect of habituation on a treadmill graded exercise test (GXT) and the relationship between response to a GXT and physical activity level, as measured by the Minnesota Leisure Time Physical Activity (LTA) questionnaire. The subjects were 12 female ballroom and folk dancers ($\bar{X} = 70$) and 12 recreational cardplayers ($\bar{X} = 72$) who participated in their respective activities three or more times a week. Each subject underwent two testing sessions with the first session involving performance of a treadmill GXT and completion of the Minnesota LTA questionnaire. The second test session involved a treadmill GXT, skinfold measurements, and completion of the Life Satisfaction Questionnaire. The only significant difference between dancers and cardplayers in cardio-respiratory fitness was supine resting HR with dancers averaging 60 b/min and the cardplayers averaging 66 b/min ($p \leq .05$). Peak HR, estimated aerobic capacity, and percent body fat estimated from skinfold measurement were not significantly different although the dancers tended to have better values than the cardplayers (155 b/min, 8.0 METS and 39.2% compared to 147 b/min, 6.8 METS, and 40.7%, respectively). Performance on the second GXT was significantly longer than the first GXT ($p \leq .05$) indicating a habituation effect. Total Activity Metabolic Index (AMI), as an estimate of leisure time physical activity, was significantly higher at 166 kcals/day for the dancers compared to 51 kcals/day for the cardplayers ($p \leq .01$). The treadmill performances of both groups combined demonstrated a moderate relationship between total time on the treadmill and total AMI ($r = .45$; $p \leq .05$). In the area of life satisfaction the dancers had a significantly greater sense of well-being than the cardplayers ($p \leq .01$)

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April 17, 1981
11:30 a.m.

DAILY PHYSICAL ACTIVITY PATTERNS OF PREPUBERTAL CHILDREN INVOLVED IN A VIGOROUS EXERCISE PROGRAM COMPARED TO CONTROLS

Susan E. MacConnie, Thomas B. Gilliam, David L. Geenen, Albert E. Pels III, Department of Physical Education, The University of Michigan, Ann Arbor, Michigan.

The purpose of this investigation was to examine daily physical activity patterns of fifty-nine children age 7 years, divided into an exercise($n=27$) and control($n=32$) group. The exercise group participated in a 25-minute vigorous, aerobic exercise session four days per week, while the control group maintained their normal daily activities. Exersentry heart rate devices, fitted to two randomly selected children per exercise session were used to assess the intensity of the exercise session and physical education class. Daily activity patterns were determined from minute-by-minute heart rates recorded from 8AM to 8PM using a Holter (AMI) monitor. Analysis of the data demonstrated a significant difference($P<.05$) between the exercise session and the physical education class for all heart rates except pre-exercise. Profile analysis of the 12-hour data indicated the exercise group spent significantly($P<.05$) less time ($n=720$) than controls at heart rates between 80 bts.min.$^{-1}$ and 100 bts.min.$^{-1}$(38±.56 percent-exercise, 42±.65 percent-controls), and significantly more time($P<.05$) at heart rates greater than 140 bts.min.$^{-1}$(11±.21 percent-exercise, 9±.08 percent-control). No significant differences($P>.05$) were observed in heart rate data collected prior to initiation of the exercise program. In conclusion, these data suggest that a vigorous physical activity program can result in changes in the daily physical activity patterns of 7 year old children - more specifically, an increase in time spent at heart rates greater than 140 bts.min.$^{-1}$.

Supported in part by NIH Grant R01 HL-22886-01

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April 17, 1981
11:45 a.m.

THE AEROBIC CAPACITY AND BODY COMPOSITION PROFILE OF PUERTO RICAN CHILDREN.

Miguel A. Rivera, Human Performance Laboratory, University of Rhode Island and Nyvea Silva, Universidad del Sagrado Corazon, Puerto Rico.

The purpose of this study was to investigate the Aerobic Capacity (VO_2 Max) and body composition measures in a sample of 8 to 12 year old Puerto Rican children. Thirty-eight females and thirty-two males underwent a Bruce Treadmill test for estimation of VO_2 max and maximal heart rate (HRmax). The body composition (BC) was determined by Skinfold Measurements. The BC measures included percent body fat (%BF) Lean Body Weight (LBW) Fat Weight (FW) and Body Density (BD). %BF was determined by the formula of Pariscova and Roth (1972). For matter of comparison we have chosen to present the data for males and females separate and combined. The results (mean values) were as follows:

	Male	Female	Total
Age (years)	9.63	10.01	9.84
HT (cm)	136.98	139.15	138.08
WT (Kg)	36.06	33.61	34.44
% BF	20.89	19.36	20.32
FW (Kg)	8.77	7.23	7.58
LBW (Kg)	27.06	26.26	26.63
BD (Gm/cc)	1.052	1.053	1.052
HRmax (beats/min)	199.11	198.36	198.44
VO_2 (ml/Kg-min)	43.32	38.65	40.09

The subjects were within the limits of their typical age group for males and females reported in the literature.

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April 17, 1981
12:00 noon

AN APPRAISAL OF PRESENT EXERCISE HABITS OF RECENT GRADUATES FROM ORAL ROBERTS UNIVERSITY, WHEATON COLLEGE, AND HARDING COLLEGE.

Judye Maxwell Rasmussen, University of Alabama.

The purpose of this study was to examine the exercise habits among college graduates from three selected institutions with different curricula requirements and to determine if there were any significant differences in exercise habits after completion of college. Subjects for the study were male and female graduates from Oral Roberts University, Wheaton College, and Harding College who were graduated in 1970 through 1977. In January 1978, a questionnaire was mailed to the 4,066 sample population of graduates. A total of 917 questionnaires were mailed to Oral Roberts graduates; 1,559 were mailed to Wheaton graduates; and 1,590 were mailed to Harding graduates. Thirteen null hypothesis related to each subpurpose of the study were tested at the .05 significance level. Comparisons were made among 239 Oral Roaberts graduates, 532 Wheaton graduates, and 466 Harding graduates of their physical participation activity patterns and average aerobic points earned. Significant differences were found in the following areas: (1) Among the exercise habits of the female graduates; (2) Among the average aerobic points earned by female graduates; (3) Among the combined nonaerobic activities engaged in by both male and female graduates; (4) Among the average aerobic points earned by the 1970 graduates; (5) Among the average aerobic points earned by the single male and single female graduates; (6) Among the average aerobic points earned by the married graduates; (7) Among the average aerobic points earned per week by the graduates who were placed in the satisfactory weight group as determined by the referenced weight table; (8) Among the orered rankings of opinions of college physical education as a contribution to knowledge and attitudes toward physical activity and fitness. The most common reason given for engaging in physical activity was for the purpose of physical fitness and health. Walking-jogging-running were the most popular physical activities engaged in by graduates from the three institutions.

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April 17, 1981
12:15 p.m.

SEX ROLE AND THE DETERMINATION OF THE SMOKING BEHAVIOR OF COLLEGE WOMEN.

Nell H. Gottlieb, The University of Texas at Austin.

Determinants of the smoking behavior of college women were studied in a survey of 953 women selected at random from four Boston-area colleges. Whether or not the woman ever smoked was significantly related to the smoking behavior of the mother, but not of the father. Multiple regression was used to ascertain the relative contributions to the woman's current amount and frequency of smoking of the smoking behavior of each parent and the woman's age cohort, as well as the contributions of the smoking behavior of her five closest male and female friends and boyfriend. The equations relating the primary socialization agents showed the smoking of the mother (Beta=.137) and the age cohort (Beta=.140) to be significantly related to the woman's frequency of smoking, while the age cohort alone was related to the amount. With regard to the peer network, only the smoking of female friends (Beta=.171 versus .017 for boyfriend and .008 for male friends) was related to the woman's frequency of smoking. The same pattern held for amount (Beta=.168 for female friends; .084 for boyfriend; and -.039 for male friends). The failure to find any relationship between the smoking behavior of the father, male friends and boyfriend and that of the woman--in contrast to that found for the mother and female friends--is intriguing. It suggests that smoking may have a special meaning to women linked to sex role and that it is transmitted through identification with the mother in the socialization process. Other research has shown higher levels of smoking for college and professional women than for their male peers. For these women, who perform in "liberated" sex roles, smoking may have acquired a secondary meaning related to aggression, power, and other traditionally masculine traits. Clearly, smoking prevention and cessation programs should address the meaning of smoking for women and how this is transmitted.

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April 17, 1981
10:45 a.m.

RESISTING PEER PRESSURES TO SMOKE: DEVELOPMENT OF A BEHAVIORAL ASSESSMENT STRATEGY.

Gary D. Nelson, Gregory M. Christenson, Marshall W. Kreuter, and Michael J. Hammes, Bureau of Health Promotion and Protection, Utah State Department of Health, Salt Lake City, Utah.

The purpose of the Utah Smoking Education Risk Reduction Program was to develop, implement, and evaluate a multiple stage educational intervention designed to prevent/delay smoking onset. A health education curriculum comprised of three dimensions of smoking prevention were developed: (1) health consequences of smoking, (2) rational decision making skills, and (3) resisting peer and media pressures to smoke. Preceded by inservice teacher training, the curriculum was implemented in a stratified sampling of elementary schools during the 1980/1981 academic years. One of the basic theoretical assumptions of the risk reduction curriculum was that peer pressures to smoke are a major contributing factor to smoking onset. In addition to the program outcome measures of student knowledge, beliefs, and behaviors, a need existed to evaluate program impact by means of a behavioral assessment of a student's skills to resist peer pressures to smoke. Social and behavioral science research indicates that resistance to persuasion may be enhanced by the use of any of the following techniques: idiosyncratic credits, psychological inoculation, recruiting an ally, and delaying a decision. Observation of the students resistance skills were obtained through the use of role-play situation conducted within experimental and control classrooms. Seven sixth grade students per class (N=63) were randomly selected to demonstrate competency in the use of defined resistance skills. The role-play situations were video-taped for subsequent evaluation by a jury of experts. No significant differences ($p < .05$) between experimental and control groups was hypothesized. Significant differences between groups were found on selected measures of resistance.

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April 17, 1981
11:00 a.m.

IMPACT OF A SMOKING PREVENTION PROGRAM ON SELECTED STUDENT OUTCOME MEASURES.

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The purpose of the Utah Smoking Education Risk Reduction Program was to develop, implement, and evaluate a multiple stage smoking educaiton risk reduction program designed to prevent/delay smoking onset. The objectives of this study included: (1) the development of a smoking risk reduction curriculum reflecting the likely contributin causes of smoking onset, (2) training elementary school teachers who will use this curriculum, (3) actual implementation of the risk reduction curriculum, (4) evaluation of program input, processes, and outcomes. The Smoking Risk Reduction Curriculum was comprised of three components: (1) knowledge of the health consequences of smoking, (2) health decision making skills, and (3) resistance to peer, media, and adult pressures to smoke. Approximately 350 students were recipients of the eductional intervention during the 1979/1980 academic year. A stratified sample of urban and rural school districts participated in the study targeted for sixth grade students (N=700). A quasi-experimental pre-test, repeated post-test design was used to evaluate the risk reduction program. Student outcome measures included knowledge, locus of control, behavioral intent, decision making skills, resistance to persuasion, and selected aspects of smoking behavior. No significant differences (p .05) between experimental and control groups were hypothesized. Results of a repeated analysis of variance and covariance indicate significant differences on selected student outcome measures.

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April 17, 1981
11:15 a.m.

HYPERTENSION EDUCATION: IMPACT ON PARENTS. Peter Walker, Lander College, Greenwood, South Carolina.

The purpose of the study was to investigate the impact of a high blood pressure education program for children on parent preventive hypertension attitudes and behaviors. The study focused attention on the parental modification of three cardiovascular risk factors (smoking, dietary salt, and high blood pressure) which have been linked with the high incidence of hypertension. The assessment of the program's impact was accomplished through the following variables: (1) perception by parents of children as significant others, (2) health locus of control, (3) health belief model variables which included parents' perception of susceptibility, severity, barriers, benefits, efficacy of treatment, health motivation and cardiovascular knowledge, (4) demographic factors of age, race, sex and education, and (5) preventive health behaviors of parents toward the risk factors of smoking, dietary salt and high blood pressure. Subjects (N=343); mostly mothers (N=272), representing the parents of sixth graders that were taught the Virginia High Blood Pressure Education Program were assessed by questionnaire. The evaluation of program impact on the preventive hypertension attitudes and behaviors of the parents was conducted seven months after the students received the VHBPEP and instructed their parents on the risk factors of smoking, dietary salt and high blood pressure. Of the eighty-five percent that responded, parents perceived their children to be an influential factor ($p < .001$) in their modification of preventive health attitudes and behaviors toward the cardiovascular risk factors (smoking, dietary salt, and high blood pressure) specifically the risk factors of dietary salt and high blood pressure ($p < .001$) accounted for most of the explained variance while smoking contributed little to the total variance. An internal locus of control, personality type that perceives control of one's health is self-determined, was found to correlate with parents' perception of children (as significant others) as health behavior modifers; and demographic factors such as race, sex, and education were predictive ($p < .05$) in determining which parental groups were most receptive to preventive hypertension health information. Conclusions include: (1) the feasibility of the use of children as significant others to modify health behaviors of parents; (2) there is a relationship between the internal health locus of control and the perception of the role of significant others; and (3) the demographic variables were predictive in identifying parental groups that were receptive health behavior modification by significant others.

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April 17, 1981
11:30 a.m.

THE DEVELOPMENT AND VALIDATION OF A KNOWLEDGE TEST OF DEATH AND DYING. James Eddy, Richard St. Pierre, Robert Shute and Wesley Alles, The Pennsylvania State University.

The purpose of this study was to develop and validate a Knowlege Test of Death and Dying. The development of this instrument followed an eight-phase model of test construction. The initial phase of this study was to define the contents of a death-and-dying course. The results of these procedures yielded 30 broad death-and-dying content areas which served as the basis of the Knowledge Test of Death and Dying. The second phase consisted of preparing test items. The initial pool of 141 items was narrowed to 90 items by a local panel of judges. In the third phase of test development, reliability, item difficulty, and discriminating data were gathered on the initial 90-item form of the test. The fourth phase in the development of a Knowledge Test of Death and Dying was to determine the content validity of each of the original 90 test items. A panel of judges ranked each item on a Likert Scale. The results from phases three and four led to phase five, the deletion of poor test items. The original 90-item instrument was reduced to the 62-item Knowledge Test of Death and Dying. The seventh phase in the development of this instrument was to gather reliability data on the Knowledge Test of Death and Dying. Both measures of internal-consistency (.742) and test-retest reliability (.755) were gathered. The final step (phase eight) in the development of the Knowledge Test of Death and Dying consisted of field testing the instrument. The Knowledge Test of Death and Dying was given as a pretest and posttest in death education classes offered in three academic disciplines at two universities. A dependent t test and a Pearson correlation were calculated for each class. The results of these procedures showed a significant increase ($P < .001$) in knowledge between treatments and a high positive correlation between test groups for all three student groups. From the findings of the eight-phase model, it was concluded that the Knowledge Test of Death and Dying is a valid instrument which can be used in death-and-dying/death education courses across a variety of academic disciplines.

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April 17, 1981
11:45 a.m.

THE EFFECT OF AN OBESITY PREVENTION PROGRAM ON SELECTED HEALTH RELATED FITNESS VARIABLES AND NUTRITION AND COGNITIVE KNOWLEDGE FOR EIGHTH GRADE PUPILS.

Donald L. Corrigan, Sandi Simons, Paul Abernathy and Oliva Wood, Purdue University, West Lafayette, IN.

The purpose of this study was to determine the effects of a 15 week obesity prevention program on 8th grade pupils. The program involved the teaching of nutrition and fitness units using prepared lessons plus a progressive aerobic running program. Knowledge tests concerning both nutrition and fitness, weight, skinfold measurements (tricept and subscpula), and a 1 1/2 mile run were measured at both pre and post program evaluations. Eight hundred fifty students from six different school districts participated in the program. Two schools were designated as treatment one (T-1) schools and were given the nutrition and fitness education lessons plus the progressive aerobic running program. Two schools were assigned to treatment two (T-2) and were given the same program as T-1 but in addition had a parental involvement program. The remaining two schools were designated as control schools. A nested factorial design was utilized for each variable. Boys' and girls' data were analized separately but the results were similar. The results indicate that there was a significant improvement in fitness and nutrition knowledge for both T-1 and T-2 groups. Also, there was significant improvement in aerobic run times and significantly decreased skinfold measurements. There were no significant differences between the T-1 and T-2 groups on any of the variables indicating that the parental involvement as used in this program was ineffective. The control group did not show significant improvements on any of the variables. Students in all groups increased weight but the T-1 and T-2 groups decreased their skinfold measurements indicating that those who participated in the program increased lean body weight. It was concluded thatan obesity prevention program can be effective in terms of nutrition and fitness knowledge and can also reduce skinfold measurements and improve aerobic run times.

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April 17, 1981
12:00 noon

ATTITUDINAL AND BEHAVIORAL ASSESSMENT OF SECONDARY SCHOOL STUDENTS RELATED TO CHOOSING SNACKS FROM VENDING MACHINES. James Eddy, R. Scott Olds, Wesley Alles and Richard St. Pierre, The Pennsylvania State University.

The purpose of this study was to examine the attitudes and behavior of secondary school students as they relate to choosing snack foods from vending machines. Secondary school students from four junior-senior high schools in the state of Pennsylvania served as the sample (N=296). A questionnaire on attitudes and behaviors related to the selection of snack foods from vending machines was developed. The questionnaire was administered to two groups. The vending group consisted of those students who had vending machines available within their schools. The non-vending group consisted of students that did not have access to vending machines within their schools. Two hypotheses were examined. First, if given a choice of vending machine snacks, students will more often choose those of a minimally nutritious nature. Second, students in secondary schools with vending machines have more negative attitudes and behavior patterns regarding snacking than do students from schools without vending machines. The analysis of the results of the questionnaire indicated that: (1) when given a choice, students choose minimally nutritious snacks more frequently than nutritious snacks (2) the presence of vending machines in a school building does not significantly affect the students selection of snacks (3) students believe snacking is part of a normal eating pattern (4) students believe they know enough about nutrition to identify snacks which are nutritious and snacks which are minimally nutritious. It was concluded that vending machines in schools are not detrimental to the students health. But rather, the types of snacks vended often contribute to obesity and dental caries. Because the revenue from vending machines often helps to fund a variety of worthwhile activities it is unlikely that vending machines will be removed from school grounds. Therefore, it is imperative that educators scrutinize the types of snacks offered in the vending machines in their school to insure that a variety of nutritious snacks are available.

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April 17, 1981
12:15 p.m.

THE ALWIN NIKOLAIS ARTIST-IN-RESIDENCE PROGRAM AT THE UNIVERSITY OF WISCONSIN - MADISON: AN ETHNOGRAPHY OF DANCE CURRICULUM-IN-USE.

Sue Ann Straits.

This case study examined curriculum intentions, actions, and outcomes of the Alwin Nikolais artist-in-residence program which was held from November 6 to December 9, 1978 at the University of Wisconsin - Madison. The research strategies used to collect and analyze data drew upon anthropological and sociological work. Information sources included participation and observation in dance courses; tape recordings of teacher-student interaction; open-ended interviews with undergraduate and graduate student groups and individuals; personal interviews with Alwin Nikolais, company teachers, residency coordinators, and Wisconsin dance faculty members; journal writings from students; still photographs and films; and historical documents. When combined, these sources provided a means of documenting the significance of the residency events in relation to subject matter, pedagogical practices, environmental influences, and social meanings. The findings of this study revealed a conflict between covering a predetermined amount of material and revealing the creative processes of dance. At different times, and for different reasons, the Nikolais residency was viewed as an interference with, a supplement to, or an integrated part of the Wisconsin Dance Program. Students' motivations and committments were influenced by various factors, including the space they worked in, the technological assistance they received, and the quality of their personal contact with Nikolais and the company teachers. For many students, the most significant moments of the residency occurred outside the formal dance class, during informal conversations with company members or observations of company rehearsals. Together, these findings suggested that the significance of subject matter and pedagogical practices shifted according to environmental conditions and the personal perspective of participants. Consequently, educational events must be studied in relation to the social, historical, and institutional dynamics of the specific setting.

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April 17, 1981
1:15 p.m.

150

THE EFFECT OF STATE AND TRAIT ANXIETY ON EVALUATED DANCE PERFORMANCE. Joel Thirer and Patricia Wilcox, Southern Illinois University - Carbondale.

The steady growth in the popularity and recognition of dance as a functional motor activity has brought an increased interest in related research that could contribute to facilitating performance. The relationship of arousal in the form of state and trait anxiety to motor performance has been repeatedly demonstrated in the sport psychology literature. Therefore, it was the purpose of this study to see whether basic application of the inverted-U hypothesis could be appropriately made regarding level of arousal and the quality of a dance performance. It was specifically hypothesized that beginning dancers who demonstrated highly significant increases in state anxiety prior to a dance performance would not perform as well as dancers demonstrating moderate increases in state anxiety. Dancers (N=18) were tested for state and trait anxiety levels during the course of a semester, and retested for state anxiety immediately prior to an evaluated dance performance. After differentiating between high and low trait anxious performers, it was found that, overall, there were significant increases in state anxiety, ($p < .05$) just prior to performing for evaluation. The data did not, however, support the inverted-U theory in that the highest performance ratings were attributed to individuals with extremely high state anxiety scores. Significantly lower performance ratings ($p < .05$) were given to individuals with significantly elevated ($p < .05$), but still moderate state anxiety scores. It was concluded that for the population of beginning dancers utilized in this study, extremely high state anxiety scores were not a performance detriment as would be expected from previous anxiety research. Analogies from general sport populations to dancers may not be appropriate until more psychological research involving dancers is reported.

Joel Thirer
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April 17, 1981
1:30 p.m.

THE SOCIAL ORGANIZATION OF LEISURE AMONG MEXICAN-AMERICANS IN HOUSTON, TEXAS.

Jay B. McMillen, Ph.D., Northeastern University, Boston, Massachusetts.

The problem addressed in this research was: do identifiable patterns of participation in leisure activities exist among Mexican-Americans? Using data from a sample of 130 Mexican-Americans living in areas of high ethnic concentration in Houston, Texas, this topic was studied. Participation extensity answers the question: was an activity participated in? Participation intensity answers the question: how many times was an activity participated in? Independent variables describing the arrangement of social persons and social groups were used to identify participation patterns in leisure behavior within the study population. In other words, this was a study of the social organization of leisure behavior among Mexican-Americans living in Houston. Identifiable patterns of subcultural social participation, or membership in voluntary and political organizations, suggested that similar patterns might be identified in leisure behavior. Leisure participation patterns were assumed to differ between Mexican-Americans and Anglo-Americans, based on previously-identified differences in social participation between the two groups. Leisure participation patterns, in terms of extensity and intensity, were examined to determine if the behavior occurred randomly among the population studied. Participation in 32 leisure activities was ranked, by extensity and intensity, and compared between two populations, Houston Mexican-Americans and the general population of the United States. Data from the Houston Population were collected for primary analysis in this study. Data collected in 1972 by teh National Opinion Research Center (NORC) from a national probability sample were used to represent the general population of the United States. Participation in the 32 leisure activities was examined in relation to 16 independent variables describing the social organization of participants. Findings indicated that leisure behavior was not a random occurrence, neither in terms of extensity nor intensity, among Mexican-Americans in Houston. There was no difference in relative popularity of the leisure activities, by extensity or intensity of participation, between Houston Mexian-Americans and the general population. Not all of the social organization variables examined were related to leisure participation. However, almost all of the identified relationships were explained by the same factors for Mexican-Americans and Anglo-Americans. The answer to the research problem is that identifiable patterns of leisure behavior do exist among Mexican-Americans. In terms of social organization of participants however, there did no appear to be any significant difference between leisure behavior patterns of Mexican- and Anglo-Americans.

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April 17, 1981
1:45 p.m.

RECREATION PARTICIPATION PATTERNS OF THE ELDERLY. Craig W. Colton, University of Maryland; Jerome F. Singleton. University of Maryland.

This study was made to examine and compare the relationship of aging and participation in recreation activities among individuals in four different sample groups.

Profiles of age and recreation participation in the groups were developed, analyzed and compared using Analysis of Covariance, Chi Square and Gamma, depending on the nature of the data. The .05 level was used in tests of significance, and .40 (or -.40) or better was used for Gamma in looking at the stronger levels of association. Older adults were divided into three age groups: 55 - 64; 65 - 74; and 75 and older. The relationship of sex, race and region of the country were also considered. The four groups were randomly selected residents of Maryland, the District of Columbia, Utah and selected recreation participants across the United States.

Participation patterns according to age were very similar in all of the groups examined. Participation in most activities declines with age, especially in the physically demanding or risk prone activities, such as outdoor sports, biking, ice skating and hunting. When the older adults were separated into the three groups, a significant decrease in participation occurred in many activities for those in the 75 and older group when compared with the younger groups. Regional differences exist in several activities. For example, hunting has higher participation at all ages in the West. Some activities have higher participation rates during certain ages. Dancing, for example, is most popular during the late teens and the twenties. Controlling for sex, race, income and occupation also revealed significant profile differences.

At present, the elderly (65 and above) are being treated as a homogeneous group. The data examined indicate that the participation patterns of those 75 and older are different from those 65 to 74. The treatment of the elderly as a homogeneous group for either research or delivery of leisure services by practitioners should be questionned.

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April 17, 1981
2:00 p.m.

THE CONGRUENCE BETWEEN ACTUAL AND DESIRED USE OF TIME BY OLDER ADULTS: A PREDICTOR OF LIFE SATISFACTION. Diane R. Seleen, University of Rhode Island.

The purposes of this study were to determine if the degree of congruence between the actual and desired time spent in various activity categories by a sample of elderly was correlated with their overall life satisfaction and to establish that combination of time-use variables which is most closely related to life satisfaction. In conjunction with this, the stated constraints for discrepancies in actual and desired time use were investigated. The sample, selected from those persons who attend senior citizen center/meal sites in the state of Rhode Island included 205 persons, 89 men and 115 women. Time use was divided into 10 activity groupings (sleep, work for pay, volunteer work, personal care, family care, media, organizations, social life, recreation, and leisure) and congruency was demonstrated by the absolute difference between the actual and desired amount of time spent in the 10 groupings during a typical week. Life satisfaction was measured by the Cantril Self-Anchoring Scale and the LSIA. In each of the activity categories those indicating no difference ranged from 90 to 96% , however, when the absolute total time difference was computed, 31% would like to reallocate some portion of their time, and 11% indicated they would like to talk to someone about making some changes. The categories of personal care, sleep, family care, organizations and work for pay correlated significantly with life satisfaction. When the variables were introduced into stepwise regression with life satisfaction, personal care, sleep, recreation, social life, and volunteer work explained 30% of the variation. Most of the constraint factors inhibiting congruency in time use were within the individual's control and not caused by external forces. All of these findings suggest that leisure counseling may be an important service available at senior citizen centers to help those elderly persons make changes within the sphere of their familiar activities to improve their quality of life.

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April 17, 1981
2:15 p.m.

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THE EFFECTS OF CREATIVE-ADVENTURE PLAYGROUND PARTICIPATION ON THE DEVELOPMENT OF VISUAL-MOTOR INTEGRATION IN YOUNG CHILDREN.

Rita Yerkes, Towson State University.

The purpose of this study was to determine if a relationship exists between creative-adventure playground participation and the development of visual-motor integration in 3-4½ year old children. This study used the Pretest-Posttest Control Group Design. Thirty-two preschool children, ages 3-4½, were screened for hearing and vision acuity. The subjects were then pretested on the Developmental Test of Visual-Motor Integration and randomly assigned to the experimental or control group within one of four preschool classes held in the Early Childhood Education Research Laboratory of Northern Illinois University. The children attended a two-hour session twice per week for six weeks. A minimum of 30 minutes was designated for play experiences during each session. The experimental group participated on the creative-adventure playground, while the control group participated in free play activities in the research laboratory. The teachers for each group were randomly assigned, given specific instructions for their play enrivonments and monitored by the researcher during the study. At the end of six weeks the subjects were posttested on the Developmental Test of Visual-Motor Integration. After statistical analysis using a correlated (dependent) *t* test and analysis of covariance, the null hypotheses were rejected at the .05 level of significance. Based on the analysis of the data, participation on the creative-adventure playground improved the visual-motor integration scores of 3-4½ year-old boys and girls. In addition a creative-adventure playground can provide an outdoor teaching resource center for the classroom teacher. This study indicates that an outdoor play environment can be used successfully to teach certain school readiness concepts.

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April 17, 1981
2:30 p.m.

INTERPRETING SPORT: PROMOTERS' CONCEPTIONS OF THE ATTRACTIONS OF MAJOR COLLEGE FOOTBALL IN NORTH CAROLINA. Janet C. Harris, University of North Carolina at Greensboro.

Interpretive research which focuses upon promotional materials that are created to attract spectators to sports events in the United States is one means of broadening scholarly understanding of the salient importance of spectator sports within American society. Considered symbolically (Geertz, 1966), advertisements may interpret and also may shape meanings associated with sports. Guided by literature pertaining to hermeneutics -- the study of interpretation (Rabinow & Sullivan, 1979; Palmer, 1969) -- and by interpretive studies of advertisements (Goffman, 1979; Inglis, 1972), the purpose of this study was to analyze and interpret advertising materials which were created to promote two series of college football games in North Carolina -- the 1980 games of UNC-Chapel Hill and of Wake Forest University -- which are recognized as components of the highest level of competition in the state. Interpretations were based on the promotional materials themselves (e.g., radio, television, and newspaper advertisements; billboards; bumper stickers) and upon the reflections of sports promotion personnel concerning characteristics of potential spectators which they considered as they created their advertising materials. Interpretive analyses of these data resulted in conclusions such as the following: (1) promotional materials were designed to promote school allegiances by members of entire communities rather than to appeal primarily to alumni; (2) some advertisements were aimed specifically at men, women or children, and none were aimed at differences in socioeconomic status or ethnicity; (3) promotions frequently suggested that college football is good family entertainment; (4) advertisements were designed to elicit strong emotional reactions similar to those sometimes experienced at sports events (the coordinator of Chapel Hill promotions said, "If the [radio and television] spots do not run a shiver down our spines we simply reject them" [Savod, 1979]); and (5) a theme was developed at each school which did not promise victory but which nevertheless had an optimistic tone (i.e., "Carolina Fever" and "Proud to be a Deacon"), and continuous connecting of the theme with most other messages in the advertising campaign suggests the possibility that a new multivocal, dominant symbol (Turner, 1964) was created and given meaning at each institution, based on promoters' perceptions of the attractions which college football has for spectators.

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April 17, 1981
3:00 p.m.

AN INVESTIGATION OF PERSONALITY CHARACTERISTICS OF BASEBALL UMPIRES. Jerry P. Dale and Arthur A. Ridgway, California State Polytechnic University, Pomona.

The purpose of this study was to investigate the personality characteristics of major league baseball umpires, student umpires who qualified to umpire in professional baseball, and student umpires who did not qualify to umpire in professional baseball as measured by the California Psychological Inventory. A secondary problem was undertaken to compare the personality characteristics derived from the norms of the CPI and each of the three umpire groups. The inventory was administered to American and National League umpires and to student umpires who attended the Al Somers Baseball Umpire School in Daytona Beach, Florida. Statistical procedures used were the one way analysis of variance and the Scheffe post-hoc test. Based upon the results of this investigation, the following conclusions were made: (1) When the factors of achievement potential and intellectual efficiency were assessed, the normative population appeared to be more capable individuals and generally demonstrated a greater degree of ambition and competitiveness than did the major league umpires. (2) The normative population reflected a stronger degree of self-regulation, self-control, and humanitarian sentiments in their relationship with others than did the student umpires who qualified for professional baseball. (3) When the factors of leadership ability, dominance, social initiative, and self-control were examined, the normative population appeared to be more stalwart individuals than did the nonqualifying students. (4) Although an element of immaturity was indicated, the level of competency of the qualifying students was not deterred by a lack of self-insight and self-understanding. (5) Major league umpires exhibited a greater degree of self-confidence and determination than did the nonqualifying student umpires, thus indicating a more secure sense of personal worth in their social interactions. (6) In general, major league umpires were categorized as being determined, efficient, hard-headed and industrious individuals, and as being less flexible in social behavior than either of the other groups measured in this study.

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April 17, 1981
3:15 p.m.

PHYSICAL FITNESS, ESTIMATION OF FITNESS AND PHYSICAL ABILITY, AND SELF-CONCEPT. Mary L. Young, University of Minnesota.

The relationship between academic achievement and self-concept is well established. The purpose of this study was to determine whether there is a corresponding relationship between another component of achievement, physical fitness, and self-concept; whether this relationship, if any, is stronger for actual fitness or estimation of fitness and physical ability; whether importance of ability or perception of how important others think it is to be good in sports and physical activities are factors; and whether there are age or sex differences. The subjects, 221 grade 7 and 9 boys and girls, were given the AAHPER Youth Fitness Test, Tennessee Self Concept Scale, and a questionnaire concerning academic achievement, estimation and perception. Separate correlation matrices were computed by sex and grade level. Partial correlation was used to control for importance of ability in sport and physical activity and for perception of the importance others attach to this ability ("importance of others"). Although only results involving the total self-concept score (TS-C) are given here, there were significant correlations between various subscale scores and the dependent variables. A significant ($p<.05$) relationship between TS-C and physical fitness was indicated for grade 7 boys ($r=.41$) but not for girls or grade 9 boys. When controlled for "importance of others", the r for grade 7 boys was .47 with a low positive relationship for grade 9 boys ($r=.23$). Estimation of physical fitness and TS-C was significantly and positively correlated for all groups except grade 7 girls. When controlled for "importance of others", the correlations were: grade 7 boys ($r=.40$), grade 9 boys ($r=.38$), grade 9 girls ($r=.33$). Correlations for estimation of ability in physical education activities and TS-C were significant only when "importance of others" was controlled and then only for grade 7 boys ($r=.36$). While the correlations between physical fitness, estimation of fitness and self-concept were quite low, they approximated those reported for academic achievement and self-concept. Although there appears to be a positive correlation between physical fitness and estimation of fitness for boys, this is not always true for girls. Controlling for the importance of ability in sports and physical activities did not appreciably affect the correlations while controlling for the perception others attach to this ability slightly raised the correlations.

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April 17, 1981
3:30 p.m.

AGE AND SEX DIFFERENCES IN EXPECTANCY FOR SUCCESS IN MOTOR PERFORMANCE.

Amelia M. Lee, Louisiana State University; Evelyn G. Hall, Louisiana State University; Jo A. Carter, University of New Orleans.

Historically, achievement in motor skills has been deemed by society to be more appropriate for males than for females. Previous research suggests that, while there are no true physiologically based reasons for performance differences, pre-pubescent boys generally perform better than girls of the same chronological age on most measures of motor proficiency. Evidence is also strong that females manifest lower expectations for success than males on most tasks, especially masculine-oriented tasks. Finally, there is evidence that sex-role patterns in today's society are changing which may result in a more favorable attitude toward movement excellence for females of all ages. The purpose of this study was to investigate expectancy for success and actual performance of boys and girls at age 7, 9, and 11 years of age in two tossing tasks. Ninety males and 90 females were tested on one task which emphasized an underhand throwing pattern (ring toss) and on a second task which emphasized the overhand throwing pattern (dart throwing). Each child was given 10 trials on each task. Before beginning the task, each child was asked to give a verbal estimate of how many successful trials out of ten they expected to complete. The order of testing was counterbalanced. Data for each task were analyzed in a 2 (sex) X 3 (grade) ANOVA. The dependent measures were expectancy scores and performance scores. Results indicated significant grade differences on actual performance on both tasks. Boys demonstrated significantly higher expectations and actual performance scores on the overhand (dart) task only. These findings provide evidence that young males expect better performance and actually perform better on tasks which have typically been male oriented. Since both sexes performed equally well and expected similar outcomes on the neutral task (ring toss), no support was given for a generalized expectation for higher level performance and higher goal-setting by males on all motor tasks.

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April 17, 1981

3:45 p.m.

DIFFERENTIAL RESPONSES TO COHESIVENESS FACTORS AMONG MALE VARSITY BASKETBALL PLAYERS FROM DIFFERENT LEVELS OF COMPETITION.

Joseph J. Gruber, University of Kentucky and Gary R. Gray, Emerald Jr. Academy, Pleasant Hill, Oregon.

The purpose of this study was to determine if the responses of male varsity basketball players to cohesiveness factors are a function of level of competition and/or importance of players to their team. Five hundred and fifteen players from five levels of competition (elementary school-8 teams, 92 players: junior high-10 teams, 116 players: senior high-9 teams, 110 players; small college-10 teams, 115 players; large college-7 teams, 82 players) responded to a cohesiveness questionnaire. A factor score for team performance satisfaction, self performance satisfaction, task cohesion and affiliation cohesion was calculated for each team. Each player was designated as a starter or reserve by his coach. Each team factor score served as the dependent variable in a 2 (player status) x 5 (level of competition) design with teams nested in the second factor. There were no significant differences between starters and reserves and among levels of competition in team performance satisfaction. Significant differences in means were found with the starters possessing more self performance satisfaction, task cohesion and affiliation cohesion when compared with the reserves. A significant decrease in self performance satisfaction was found when moving from the elementary and junior high to more intense levels of competition. Affiliation cohesion was significantly lower when moving from elementary and junior high to the senior high, small college and large college teams. There was a significant increase in task cohesion from the elementary to junior high level. Junior high, senior high and small college task cohesion scores were about the same. However, large college task cohesion scores were lower than those found in elementary school. The interaction between player status and level of competition was not significant.

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April 17, 1981

4:00 p.m.

THE RELATIONSHIP BETWEEN SELF AND STUDENTS' PERCEPTION OF AFFECTIVE CHARACTERISTICS AND SELECTED VERBAL AND NONVERBAL BEHAVIORS OF SEVENTH GRADE PHYSICAL EDUCATION TEACHERS.

Maxine L. Thomas, Portland State University, Portland, Oregon.

The purposes of the study were: (1)to determine if differences existed in verbal and nonverbal behaviors between high affect and low affect P.E. teachers, (2)to obtain qualitative data about how teachers perceive themselves and how pupils perceive their teachers and(3)to provide a model for measuring affect. High and low affect teachers were selected based on congruence of self-perception scores with pupil perception scores. CAFIAS was used in identifying verbal and nonverbal teacher behaviors. Categories tested were:(1)verbal behavior, (2)nonverbal behavior, (3)verbal and nonverbal criticism and (4)verbal and nonverbal praise. Differences were found between the high and low groups in the category of praise and between males and females in the category of verbal behavior. In addition to the quantitative data, teachers and their pupils were asked to write words or phrases that described the teacher and to mark each with a positive or negative symbol to identify how the descriptive word or phrase was perceived. The written responses of pupils fell into four categories: (1)personal appearance, (2)attitude toward activity, (3)affect and (4)teaching and organization. Statistical differences were found in the categories of attitude toward activity and affect. The total of positive comments in all four categories indicated more positive comments were made by pupils of teachers in the high group. The total of negative comments in all four categories indicated more negative comments were made by pupils of teachers in the low group. Teachers in the high group evaluated the phrases they wrote about themselves with more positive symbols than did the low group. Male teachers evaluated themselves with more positive symbols than did females. It was concluded that there are measurable behavioral differences between teachers with perceived high and low degrees of positive affect. The qualitative information obtained from pupils indicate a high interest in the affective characteristics of their teachers and a difference between groups in attitude toward activity. Lastly, it was concluded that perceptions of teacher and pupils may be an appropriate method to measure affect.

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April 17, 1981
4:15 p.m.

THE RELATIONSHIPS AMONG INTELLIGENCE, GENDER, ASPIRATION LEVEL AND LEVEL OF ACHIEVEMENT IN MOTOR SKILL ACTIVITIES.

Noel Blundell, University of Tennessee, Knoxville, Tennessee

The purpose of this study was: (a) to investigate the relationship among intelligence, aspiration level for four motor skill activities, and level of achievement in the same four activities and (b) to determine if there were gender differences for any of the variables stated above. One hundred and four Australian eighth grade students (54 boys and 50 girls) aged between 12 and 14 years, with no previous field hockey experience, participated in the study. During the initial three weeks of the study students were provided with instruction and practice on four field hockey skills. These skills were (a) shuttle run, utilizing a hockey stick, (b) dribbling course, (c) hit for distance and accuracy, (d) push for distance and accuracy. Following exposure to the above, each student was given two trials on each of the four skill tests and was subsequently asked to record on a contract sheet an estimate of his/her future level of attainment. The students had four weeks of self structured practice on the skill tasks. During the seventh and eighth weeks they were evaluated on the four skills. Intelligence was measured by the "Inter D" test, administered state wide by school counsellors just prior to student participation in this study.

Kendall's tau correlation indicated that there was no significant relationship between intelligence and aspiration level. Intelligence was found to be significantly related to the skill level attained on the dribbling course yet not related to any of the other three skill attainments. The Pearson product-moment analysis revealed that aspiration level for each of the four skills and the respective skill level were significantly correlated. Four significant one way MANOVA's on gender were produced with the aspiration level and skill level paired for each of the four skills. Generalizing the results of the univariate ANOVA's:

(a) males had higher aspiration levels and skill levels than females on all four tasks,

(b) in three of the motor tasks (shuttle run, push, hit) the skill level was influenced more significantly by gender than the paired aspiration level, and,

(c) in the dribble, aspiration level was more significantly influenced by gender than the paired skill level.

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April 17, 1981
4:30 p.m.

THE RELATIONSHIP AND IMPLICATIONS OF ANDROGYNOUS ATTRIBUTES IN FEMALE ATHLETES AND THEIR ATTITUDES TOWARD THE ROLE OF WOMEN.

V.L.Eskridge, Ithaca College, Lisa A. Millar.

Women in sports offers a situation that overtly demonstrates the contradictions of maintaining a stereotypic feminine role while assuming a role in a domain that requires stereotypic masculine behaviors. The present paper pertains to the attributes of androgyny and the attitudes toward the role of women in society with particular reference to the female athlete. The PAQ and the AWS were the specific tools used for testing the respective concepts. Female subjects (n=102) were grouped as athletes or non athletes, and physical education majors or non physical education majors. Differences in attitude toward the role of women in society between groups were determined by a two-way analysis of variance. Chi-square analysis were used to determine the differences between groups and sex role identity classifications. No significant differences in attitude toward women were found between athletes and non-athletes or majors. No significant relationship was found between the scores of the AWS and the subscales of the PAQ. However, when all athlete and physical education majors were compared to non athlete-non physical education majors significant differences were found. It appears that involvement in sport, not necessarily participation on an athletic team, either attracts the androgynous woman or enhances the androgynous sex role identity of a woman.

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April 17, 1981
4:45 p.m.

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